



MOTOROLA

Portable Cellular Phone Class II SAR Test Report

Tests Requested By: Motorola Mobile Devices
 600 N. US Highway 45
 Libertyville, IL 60048
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Test Laboratory: Motorola Mobile Devices Business ADR Test Services Laboratory
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 This laboratory is accredited to ISO/IEC 17025-2005 to perform the following tests:

Accreditation:



Testing Laboratory
No. 2404

Tests:

Electromagnetic Specific Absorption Rate

Procedures:

IEC 62209-1

RSS-102

IEEE 1528 - 2003

FCC OET Bulletin 65 (including Supplement C)

Australian Communications Authority Radio

Communications (Electromagnetic Radiation – Human Exposure) Standard 2003

CENELEC EN 50360

ARIB Std. T-56 (2002)

On the following products or types of products:

On the following products or types of products: Wireless Communications Devices (Examples): Two Way Radios; Portable Phones (including Cellular, Licensed Non-Broadcast and PCS); Low Frequency Readers; and Pagers

Motorola declares under its sole responsibility that the portable cellular telephone model to which this declaration relates, is in conformity with the appropriate General Population/Uncontrolled RF exposure standards, recommendations and guidelines (FCC 47 CFR §2.1093) as well as with CENELEC en50360:2001 and ANSI / IEEE C95.1. It also declares that the product was tested in accordance with IEEE 1528 / CENELEC EN62209-1 (2006), as well as other appropriate measurement standards, guidelines and recommended practices. Any deviations from these standards, guidelines and recommended practices are noted below:

(none)

Statement of Compliance:

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Revision History

Revision Version	Date	Notes
Rev. 0	Oct-20-2011	Initial report release.

1. Introduction

The Motorola Mobile Devices Business ADR Test Services Laboratory has performed measurements of the maximum potential exposure to the user of the portable cellular phone covered by this test report. The Specific Absorption Rate (SAR) of this product was measured. The portable cellular phone was tested in accordance with [1], [4] and [5]. The SAR values measured for the portable cellular phone are below the maximum recommended levels of 1.6 W/kg in a 1g average set in [3] and 2.0W/kg in a 10g average set in [2].

For ANSI / IEEE C95.1 (1g), the final stand-alone SAR reading for this are shown below. These measurements were performed using a Dasy4™ v4.7 system manufactured by Schmid & Partner Engineering AG (SPEAG), of Zurich Switzerland.

Transmit Band	Head SAR (1 g ^w /kg)	Body SAR (1 g ^w /kg)	Mobile Hotspot SAR (1 g ^w /kg)
GSM 850	0.29	0.36	0.77
WCDMA 850	0.40	0.27	0.98
GSM 1900	0.48	0.14	0.51
WCDMA 1900	0.58	0.17	0.81
Wi-Fi 2.45 GHz	0.15	0.04	0.24

2. Description of the Device Under Test

2.1 Antenna description

Main Antenna (WCDMA/GSM)

Type	Internal	
Location	Back Surface, Bottom of the Phone	
Dimensions	Length	56 mm
	Width	10 mm

WiFi / Bluetooth Antenna

Type	Internal	
Location	Back Surface, Left Edge of the Phone	
Dimensions	Length	1 mm
	Width	18.4 mm

2.2 Device description

Serial Number(s)	356472040000383 (Conducted power measurements and SAR testing of GSM and WCDMA modes) 356472040014939 (Wi-Fi SAR measurements)
Production Unit or Identical Prototype (47 CFR §2.908)	Identical Prototype
Device Category	Portable

Mode(s) of Operation	Modulation Mode(s)	Maximum Output Power Setting	Duty Cycle	Transmitting Frequency Range(s)
GSM 850	GMSK	33.0 dBm	1:8	824.2 - 848.8 MHz
GSM 1900	GMSK	30.0 dBm	1:8	1850.2 - 1909.8 MHz
WCDMA 850	QPSK	24.0 dBm	1:1	826.4 - 846.6 MHz
WCDMA 1900	QPSK	24.0 dBm	1:1	1852.4 - 1907.6 MHz
Wi-Fi 802.11b/g/n	BPSK	19.17 dBm	1:1	2412.0 - 2462.5 MHz
Bluetooth	GFSK	9.57 dBm	1:1	2402.0 - 2483.5 MHz

GSM Data Functionality	GPRS/EDGE Class 12 (4 uplink timeslots; 4 downlink timeslots; 5 total timeslots per frame)
	Class B (DTM not supported)

Mode(s) of Operation	GPRS/EDGE 850				GPRS/EDGE 1900			
	GMSK				GMSK			
Maximum Output Power Setting (dBm)	33.0	31.0	29.0	28.0	30.0	28.0	26.0	25.0
Time Average Output Power Setting (dBm)	24.0	25.0	24.7	25.0	21.0	22.0	21.7	22.0
Duty Cycle	1:8	2:8	3:8	4:8	1:8	2:8	3:8	4:8
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				1850.2 - 1909.8 MHz			

Mode(s) of Operation	EDGE 850				EDGE 1900			
	8PSK				8PSK			
Maximum Output Power Setting (dBm)	27.0	26.0	24.0	23.0	26.0	26.0	24.0	23.0
Time Average Output Power Setting (dBm)	18.0	20.0	19.7	20.0	18.0	20.0	19.7	20.0
Duty Cycle	1:8	2:8	3:8	4:8	1:8	2:8	3:8	4:8
Transmitting Frequency Range(s)	824.2 - 848.8 MHz				1850.2 - 1909.8 MHz			

2.3 Device Conducted Power Measurements

2.3.1 Measured GSM Mode Conducted Power Levels

Band	Channel	Peak Conducted power (dBm) for GSM modes								
		GMSK <i>CS Voice</i> (1 Slot)	GMSK <i>PS Data</i> (1 Slots)	GMSK <i>PS Data</i> (2 Slots)	GMSK <i>PS Data</i> (3 Slots)	GMSK <i>PS Data</i> (4 Slots)	8-PSK <i>PS Data</i> (1 Slots)	8-PSK <i>PS Data</i> (2 Slots)	8-PSK <i>PS Data</i> (3 Slots)	8-PSK <i>PS Data</i> (4 Slots)
850	128	33.20	33.12	30.92	28.92	27.91	26.98	26.01	23.95	22.95
	190	32.77	32.55	30.78	28.64	27.92	26.80	25.92	23.67	22.86
	251	32.18	32.73	30.52	28.56	27.90	26.80	25.93	23.75	22.95
1900	512	29.84	29.90	27.13	25.18	24.61	25.83	25.80	23.40	22.64
	661	30.02	30.16	27.54	25.79	25.07	26.02	26.00	23.55	22.84
	810	30.17	30.20	28.17	26.19	25.20	26.20	25.99	23.83	23.20

Band	Channel	Time Averaged Conducted power (dBm) for GSM modes								
		GMSK <i>CS Voice</i> (1 Slot)	GMSK <i>PS Data</i> (1 Slots)	GMSK <i>PS Data</i> (2 Slots)	GMSK <i>PS Data</i> (3 Slots)	GMSK <i>PS Data</i> (4 Slots)	8-PSK <i>PS Data</i> (1 Slots)	8-PSK <i>PS Data</i> (2 Slots)	8-PSK <i>PS Data</i> (3 Slots)	8-PSK <i>PS Data</i> (4 Slots)
850	128	24.20	24.12	24.92	24.62	24.91	17.98	20.01	19.65	19.95
	190	23.77	23.55	24.78	24.34	24.92	17.80	19.92	19.37	19.86
	251	23.18	23.73	24.52	24.26	24.90	17.80	19.93	19.45	19.95
1900	512	20.84	20.90	21.13	20.88	21.61	16.83	19.80	19.10	19.64
	661	21.02	21.16	21.54	21.49	22.07	17.02	20.00	19.25	19.84
	810	21.17	21.20	22.17	21.89	22.20	17.20	19.99	19.53	20.20

2.3.2 WCDMA modes

Per the “SAR Measurement Procedures for 3G Devices” released in October, 2007, 12.2 kbps RMC, 12.2 kbps AMR, HS-DPCCH Sub-test 1-4, and E-DCH Sub-test 1-5 modes were considered. The conducted power measurements (per section 5.2 of 3GPP TS 34.121) for each mode are shown in the table below.

Band	Channel	Conducted power (dBm) for WCDMA modes		Conducted Power (dBm) for WCDMA – HSDPA (Rel 5) Modes				Conducted Power (dBm) for WCDMA – HSPA (HSUPA/HSDPA-Rel 6) Modes				
		RMC	AMR	Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 5
WCDMA 850	4132	24.09	24.05	23.99	24.04	24.03	24.04	24.01	24.04	23.98	24.05	24.00
	4180	24.20	24.09	24.10	24.04	24.11	24.05	24.10	23.95	24.04	24.09	24.09
	4233	24.08	23.98	23.88	23.82	23.93	23.8	23.96	23.8	23.94	23.88	23.96
WCDMA 1900	9262	24.11	23.91	23.85	23.8	23.87	23.95	23.89	23.82	23.93	23.88	23.96
	9400	24.18	23.97	23.88	23.89	23.88	23.63	23.94	23.88	23.95	23.89	23.99
	9538	23.88	23.65	23.52	23.49	23.61	23.74	23.60	23.59	23.6	23.58	23.68

Maximum Power Reduction (MPR)

According to 3GPP 25.101 sub-clause 6.2.2, the maximum output power is allowed to be reduced by following the table.

Table 6.1A: UE maximum output power with HS-DPCCH and E-DCH

UE transmit channel configuration	CM (dB)	MPR (dB)
For all combinations of; DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH	$0 \leq CM \leq 3.5$	MAX (CM-1, 0)
Note 1: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.		

The device supports MPR to solve linearity issues (ACLR or SEM) due to the higher peak-to-average ratios (PAR) of the HSUPA signal. This prevents saturating the full range of the TX DAC inside of device and provides a reduced power output to the RF transceiver chip according to the Cubic Metric (a function of the combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH).

When E-DPDCH channels are present, the beta gains on those channels are reduced first to try to get the power under the allowed limit. If the beta gains are lowered as far as possible, then a hard limiting is applied at the maximum allowed level.

The SW currently recalculates the cubic metric every time the beta gains on the E-DPDCH are reduced. The cubic metric will likely get lower each time this is done. However, there is no reported reduction of maximum output power in the HSUPA mode since the device also provides a mechanism to compensate for the power back-off by increasing the gain of TX_AGC in the transceiver (PA) device.

The end effect is that the DUT output power is identical to the case where there is no MPR in the device.

2.3.3 Wi-Fi 802.11 modes

Per “SAR Measurement Procedures for 802.11 a/b/g Transmitters” (FCC KDB pub. 248227), power measurements were performed for 802.11 operational modes. The conducted power measurements for each mode are shown in the table below. SAR testing for 802.11 modes was performed with the transmitter mode and data rate set to the configurations highlighted in bold below. The head and body positions that resulted in the highest SAR values were further tested on the additional channels and higher data rates highlighted in blue in the tables below.

Band	Channel	Conducted Power (dBm) for 802.11b Mode Data Rates			
		1 Mbps	2 Mbps	5.5 Mbps	11 Mbps
Wi-Fi 2450 MHz	1	17.73	17.88	18.91	19.01
	6	17.97	18.13	19.12	19.17
	11	17.83	17.86	19.04	18.89

Band	Channel	Conducted Power (dBm) for 802.11g Mode Data Rates							
		6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps
Wi-Fi 2450 MHz	1	17.68	17.65	17.18	17.2	15.73	15.69	14.38	14.34
	6	17.91	17.84	17.43	17.42	15.93	15.87	14.55	14.55
	11	17.63	17.71	17.27	17.37	15.82	15.85	14.38	14.75

Band	Channel	Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 800 ns Guard Interval)							
		6.5 Mbps	13 Mbps	19.5 Mbps	26 Mbps	39 Mbps	52 Mbps	58.5 Mbps	65 Mbps
Wi-Fi 2450 MHz	1	17.59	17.23	17.22	15.65	15.64	14.17	14.1	13.24
	6	17.83	17.43	17.46	15.74	15.87	14.18	14.29	13.45
	11	17.68	17.16	17.36	15.74	15.75	14.14	14.15	13.23

Band	Channel	Conducted Power (dBm) for 802.11n Mode Data Rates (20 MHz Channel, 400 ns Guard Interval)							
		7.2 Mbps	14.4 Mbps	21.6 Mbps	28.8 Mbps	43.3 Mbps	57.7 Mbps	65 Mbps	72.2 Mbps
Wi-Fi 2450 MHz	1	17.53	17.1	17.13	15.56	15.71	14.17	14.15	13.32
	6	17.74	17.34	17.34	15.87	15.85	14.51	14.39	13.53
	11	17.59	17.09	17.17	15.54	15.69	15.2	14.18	13.37

3. Test Equipment Used

3.1 Dosimetric System

The Motorola Mobile Devices Business ADR Test Services Laboratory utilizes a Dosimetric Assessment System (Dasy4™ v4.7) manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. All the SAR measurements are taken within a shielded enclosure. The overall 10g RSS uncertainty of the measurement system is $\pm 10.8\%$ (K=1) with an expanded uncertainty of $\pm 21.6\%$ (K=2). The overall 1g RSS uncertainty of the measurement system is $\pm 11.1\%$ (K=1) with an expanded uncertainty of $\pm 22.2\%$ (K=2). The measurement uncertainty budget is given in Appendix 7. Per IEEE 1528, this uncertainty budget is applicable to the SAR range of 0.4W/kg to 10W/kg.

The list of calibrated equipment used for the measurements is shown in the following table.

Description	Serial Number	Cal Due Date
DASY4™ DAE V1	SN 702	14-Apr-2012
E-Field Probe ES3DV3	SN 3184	11-Mar-2012
S.A.M. Phantom used for 800 MHz	TP-1235	
S.A.M. Phantom used for 1900 / 2450 MHz	TP-1136	
Dipole Validation Kit, DV835V2	436tr	18-Mar-2013
Dipole Validation Kit, DV1800V2	271tr	8-Mar-2012
Dipole Validation Kit, DV2450V2	740	17-Mar-2013

3.2 Additional Equipment

Description	Serial Number	Cal Date	Cal Due Date
Signal Generator HP8648C	3847A04982	Nov-18-2009	Nov-18-2011
Power Meter E4419B	GB39510900	Mar-28-2011	Mar-28-2013
Power Sensor #1 - E9301A	US39211007	Aug-16-2011	Aug-16-2012
Power Sensor #2 - E9301A	US39211008	Aug-16-2011	Aug-16-2012
Signal Generator HP8648C	3847A04632	Aug-13-2011	Aug-13-2013
Power Meter E4419B	GB39511087	Dec-22-2009	Dec-22-2011
Power Sensor #1 - E9301A	US39211006	Oct-25-2010	Oct-25-2011
Power Sensor #2 - E9301A	US39210934	Oct-25-2010	Oct-25-2011
Signal Generator HP8648C	3847A04843	Mar-28-2011	Mar-28-2013
Power Meter E4419B	GB39511084	Mar-28-2011	Mar-28-2013
Power Sensor #1 - E9301A	US39210929	Mar-31-2011	Mar-31-2012
Power Sensor #2 - E9301A	US39210930	Mar-31-2011	Mar-31-2012
Network Analyzer HP8753ES	US39171846	May-19-2011	May-19-2012
Dielectric Probe Kit HP85070C	US99360070		

4. Electrical parameters of the tissue simulating liquid

Prior to conducting SAR measurements, the relative permittivity, ϵ_r , and the conductivity, σ , of the tissue simulating liquids were measured with a HP85070 Dielectric Probe Kit. These values, along with the temperature of the simulated tissue are shown in the table below. The recommended limits for permittivity and conductivity are also shown. A mass density of $\rho=1\text{g/cm}^3$ was entered into the system in all the cases. It can be seen that the measured parameters are within tolerance of the recommended limits specified in [1] and [5].

E-field probes calibrated at 1810 MHz were used for "1900 MHz" band (1850 MHz - 1910 MHz) SAR measurements. FCC KDB pub. 450824 provides additional requirements on page 3 of 6 for SAR testing that is performed with probe calibration points that are more than 50 MHz removed from the measured bands. The KDB requires; "(2) When nominal tissue dielectric parameters are specified in the probe calibration data, the tissue dielectric parameters measured for routine measurements should be less than the target ϵ_r and higher than the target Sigma values to minimize SAR underestimations". The 1900 MHz simulated tissues listed below meet these criteria.

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			ϵ_r	σ (S/m)	Temp (°C)
835	Head	Measured, 10/7/2011	41.5	0.92	19.6
		Measured, 10/8/2011	41.2	0.91	19.8
		Measured, 10/22/2011	40.2	0.90	20.1
		Recommended Limits	39.4 - 43.6	0.86 - 0.95	18-25
	Body	Measured, 10/8/2011	55.0	0.98	19.3
		Measured, 10/15/2011	54.1	0.97	19.2
		Measured, 10/17/2011	54.0	0.98	19.9
Recommended Limits	52.4 - 58.0	0.92 - 1.02	18-25		
1880	Head	Measured, 10/10/2011	38.0	1.46	19.5
		Measured, 10/16/2011	38.8	1.44	19.8
		Measured, 10/22/2011	38.0	1.45	20.1
		Recommended Limits	38.0 - 40.0	1.40 - 1.47	18-25
	Body	Measured, 10/16/2011	50.8	1.57	19.9
		Measured, 10/17/2011	51.2	1.56	19.6
		Recommended Limits	50.6 - 53.3	1.52 - 1.60	18-25
2450	Head	Measured, 10/21/2011	38.1	1.85	19.7
		Measured, 10/22/2011	38.1	1.86	19.5
		Recommended Limits	39.2 ±5%	1.80 ±5%	18-25
	Body	Measured, 10/21/2011	50.8	19.5	19.5
		Recommended Limits	52.7 ±5%	1.95 ±5%	18-25

The list of ingredients and the percent composition used for the tissue simulates are indicated in the table below.

Ingredient	835MHz / 900 MHz	835MHz / 900 MHz	1800MHz / 1900 MHz	1800 MHz / 1900 MHz	2450MHz	2450 MHz
	Head	Body	Head	Body	Head	Body
Sugar	57	44.9	--	--	--	--
DGBE	--	--	47	30.8	--	30
Diacetin	--	--	--	--	51	--
Water	40.45	53.06	52.62	68.8	48.75	70
Salt	1.45	0.94	0.38	0.4	0.15	--
HEC	1	1	--	--	--	--
Bact.	0.1	0.1	--	--	0.1	--

5. System Accuracy Verification

A system accuracy verification of the DASY4™ was performed using the measurement equipment listed in Section 3.1. The daily system accuracy verification occurs within the flat section of the SAM phantom.

A SAR measurement was performed to verify the measured SAR was within ±10% from the target SAR indicated in Appendix 8. These frequencies are within ±10% of the compliance test mid-band frequency as required in [1] and [5]. The test was conducted on the same days as the measurement of the DUT. Recommended limits for permittivity and conductivity, specified in [5], are shown in the table below. The obtained results from the system accuracy verification are also displayed in the table below. SAR values are normalized to 1W forward power delivered to the dipole. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values. The distributions of SAR compare well with those of the reference measurements (see Appendix 1). The tissue stimulant depth was verified to be 15.0cm ±0.5cm. Z-axis scans showing the SAR penetration are also included in Appendix 1.

System Accuracy Verification Measurements for Head SAR Measurements							
f (MHz)	Description	Measured SAR (W/kg), 1 gram	Normalized SAR (W/kg), 1 gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
				ε _r	σ (S/m)		
835	Measured, 10/6/2011	2.0	10.0	41.5	0.92	21.0	20.5
	Measured, 10/7/2011	2.0	10.0	41.2	0.91	21.0	20.0
	Measured, 10/22/2011	1.97	9.85	40.2	0.90	21.4	20.0
	Recommended Limits	2.42	9.73	41.5 ±5%	0.90 ±5%	18-25	18-25
1800	Measured, 10/10/2011	7.89	39.45	38.4	1.37	21.0	20.6
	Measured, 10/16/2011	7.55	37.75	38.3	1.36	21.3	20.1
	Measured, 10/22/2011	7.69	38.4	38.3	1.38	21.4	20.5
	Recommended Limits	9.41	38.5	40.0 ±5%	1.40 ±5%	18-25	18-25
2450	Measured, 10/21/2011	11.5	57.5	38.1	1.85	21.2	20.8
	Measured, 10/22/2011	10.9	54.5	38.1	1.86	21.4	20.5
	Recommended Limits	13.2	53.8±10%	39.2 ±5%	1.80 ±5%	18-25	18-25

System Accuracy Verification Measurements for Body SAR Measurements							
f (MHz)	Description	Measured SAR (W/kg), 1 gram	Normalized SAR (W/kg), 1 gram	Dielectric Parameters		Ambient Temp (°C)	Tissue Temp (°C)
				ε _r	σ (S/m)		
835	Measured, 10/8/2011	1.99	9.95	55.0	0.98	21.1	20.1
	Measured, 10/15/2011	1.98	9.9	54.1	0.97	21.1	19.6
	Measured, 10/17/2011	1.99	9.95	54.0	0.98	21.5	20.3
	Recommended Limits	2.56	10.1	55.2 ±5%	0.97 ±5%	18-25	18-25
1800	Measured, 10/16/2011	7.79	38.95	51.0	1.47	21.5	20.9
	Measured, 10/17/2011	7.95	39.75	51.4	1.46	21.4	20.3
	Recommended Limits	9.25	37.9	53.3 ±5%	1.52 ±5%	18-25	18-25
2450	Measured, 10/21/2011	10.3	51.5	50.8	1.95	21.5	20.5
	Recommended Limits	12.8	51.3±10%	52.7 ±5%	1.95 ±5%	18-25	18-25

The following probe conversion factors were used on the E-Field probe(s) used for the system accuracy verification measurements:

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	SN 3184	835 – Head	6.11	5 of 11
		835 – Body	6.1	6 of 11
		1810 – Head	5.11	5 of 11
		1810 - Body	4.9	6 of 11
		2450 – Head	4.48	5 of 11
		2450 – Body	4.33	6 of 11

6. Test Results

For GSM and WCDMA modes, the test sample was operated using an actual transmission through a base station simulator. Wi-Fi testing was conducted using manufacturer test mode software, per guidance given in FCC KDB 248227. The base station simulator or test software was set up for the proper channels, transmitter power levels and transmit modes of operation.

The phone was tested in the configurations stipulated in [1], [4] and [5]. The phone was positioned into these configurations using the device holder supplied with the DASY4™ SAR measurement system. The default settings for the “coarse” and “cube” scans were chosen and used for measurements. The grid spacing of the coarse scan was set to 15 mm or less as shown in the SAR plots included in Appendices 2 through 5. Please refer to the DASY4™ manual for additional information on SAR scanning procedures and algorithms used.

The DUT covered by this report has the following battery options:
SNN5891A - 1600 mAH Battery

This battery was used to do all of the SAR testing. The phone was placed in the SAR measurement system with a fully charged battery.

6.1 Head Adjacent Test Results

The SAR results shown in tables 1 through 4 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to [6]. Also shown are the temperature of the simulated tissue after the test, the measured drift, the measured conducted output power levels, power reduction amount (when applicable), the measured SAR corrected for probe calibration (when applicable), and the extrapolated SAR. The exact method of extrapolation is:

$$\text{Extrapolated SAR} = (\text{Measured or Corrected SAR}) * 10^{(-\text{drift}/10)}$$

The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

The left head and right head SAR contour distributions are similar. Because of this similarity, the cheek/touch and 15° tilt test conditions with the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 2. All other test conditions measured lower SAR values than those included in Appendix 2.

The SAR measurements were performed using the SAM phantoms listed in section 3.1. Since the same phantoms and simulated tissue were used for the system accuracy verification and the device SAR measurements, the Z-axis scans included in Appendix 1 are applicable for verification of simulated tissue depth to be 15.0cm ±0.5cm.

The following probe conversion factors were used on the E-Field probe(s) used for the head adjacent measurements:

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	SN 3184	835	6.11	5 of 11
		1810	5.11	5 of 11
		2450	4.48	5 of 11

Left Head Cheek Position															
f (MHz)	Mode	Battery/Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GSM 850, CS Voice	SNN5899A	128												
			190	20.4	-0.0709	32.77		0.185		0.19	0.25		0.25		
			251												
	WCDMA 850, 12.2 kbps RMC		4132												
			4180	20.6	0.0839	24.20		0.253		0.25	0.339		0.34		
1880	GSM 1900, CS Voice	512													
		661	20.6	-0.0599	30.02		0.262		0.27	0.432		0.44			
		810													
	WCDMA 1900, 12.2 kbps RMC	9262													
		9400	19.8	-0.0995	24.18		0.343		0.35	0.562		0.58	5x5x7	54	
2450	802.11b, 1 Mbps	1	20	0.11	17.73		0.0584		0.06	0.126		0.13			
		6	20	0.141	17.97		0.0619		0.06	0.134		0.13			
		11	19.7	0.125	17.83		0.0578		0.06	0.125		0.13			
	802.11b, 5.5 Mbps	1	20.1	0.283	18.91		0.0719		0.07	0.153		0.15	5x5x7	55	
		6	20.1	0.233	19.12		0.065		0.07	0.14		0.14			
		11	20.1	0.402	19.04		0.0651		0.07	0.142		0.14			
	802.11b, 11 Mbps	1	20.1	0.089	19.01		0.0634		0.06	0.139		0.14			
		6	20.1	0.139	19.17		0.0639		0.06	0.14		0.14			
		11	20.1	0.244	18.89		0.0618		0.06	0.136		0.14			

Table 1: SAR measurement results at the highest possible output power, measured in a head cheek position against the ICNIRP and ANSI SAR Limit.

Right Head Cheek Position															
f (MHz)	Mode	Battery/Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GSM 850, CS Voice	SNN5899A	128												
			190	20.4	-0.0118	32.77		0.222		0.22	0.294		0.29	5x5x7	56
			251												
	GPRS 850, PS Data 4 Uplots		190	19.7	-0.42	27.92		0.273		0.30	0.363		0.40	5x5x7	57
			4132												
1880	WCDMA 850, 12.2 kbps RMC	4180	20.3	-0.0829	24.20		0.30		0.31	0.395		0.40	5x5x7	58	
		4233													
		512													
	GSM 1900, CS Voice	661	20.6	-0.076	30.02		0.288		0.29	0.474		0.48	5x5x7	59	
		810													
2450	802.11b, 1 Mbps	661	20.5	-0.255	25.07		0.314		0.33	0.531		0.56	5x5x7	60	
		9262													
		9400	19.7	-0.0036	24.18		0.341		0.34	0.567		0.57			

Table 2: SAR measurement results at the highest possible output power, measured in a head cheek position against the ICNIRP and ANSI SAR Limit.

Left Head 15° Tilt Position															
f (MHz)	Mode	Battery/Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GSM 850, CS Voice	SNN5899A	128												
			190	20.4	-0.014	32.77		0.136		0.14	0.18		0.18		
			251												
	WCDMA 850, 12.2 kbps RMC		4132												
			4180	20.3	-0.0118	24.20		0.19		0.19	0.251		0.25		
1880	GSM 1900, CS Voice	512													
		661	20.6	-0.038	30.02		0.124		0.13	0.194		0.20	5x5x7	61	
		810													
	WCDMA 1900, 12.2 kbps RMC	9262													
		9400	19.8	0.0031	24.18		0.156		0.16	0.248		0.25	5x5x7	62	
2450	802.11b, 1 Mbps	9538													
		1													
		6	20.0	-0.0069	17.97		0.0122		0.01	0.0247		0.02			
			11												

Table 3: SAR measurement results at the highest possible output power, measured in a head tilt position against the ICNIRP and ANSI SAR Limit.

Right Head 15° Tilt Position															
f (MHz)	Mode	Battery/Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GSM 850, CS Voice	SNN5899A	128												
			190	20.4	-0.107	32.77		0.139		0.14	0.184		0.19	5x5x7	63
			251												
	WCDMA 850, 12.2 kbps RMC		4132												
			4180	19.9	0.0475	24.20		0.203		0.20	0.269		0.27	5x5x7	64
1880	GSM 1900, CS Voice	4233													
		512													
		661	20.6	-0.112	30.02		0.112		0.11	0.194		0.20			
	WCDMA 1900, 12.2 kbps RMC	810													
		9262													
2450	802.11b, 1 Mbps	9400	19.8	0.057	24.18		0.143		0.14	0.246		0.25			
		9538													
		1													
			6	20.0	0.103	17.97		0.0134		0.01	0.0263		0.03	5x5x7	65
			11												

Table 4: SAR measurement results at the highest possible output power, measured in a head tilt position against the ICNIRP and ANSI SAR Limit.

6.2 Body Worn Test Results

The SAR results shown in tables 5 and 6 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to [6]. Also shown are the temperature of the simulated tissue after the test, the measured drift, the measured conducted output power levels, power reduction amount (when applicable), the measured SAR corrected for probe calibration (when applicable), and the extrapolated SAR. The exact method of extrapolation is:

$$\text{Extrapolated SAR} = (\text{Measured or Corrected SAR}) * 10^{(-\text{drift}/10)}$$

The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

The test conditions that produced the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 3. All other test conditions measured lower SAR values than those included in Appendix 3.

A “flat” phantom was for the body-worn tests. This “flat” phantom is made out of 1” thick natural High Density Polyethylene with a thickness at the bottom equal to 2.0mm. It measures 52.7 cm(long) x 26.7cm(wide) x 21.2cm(tall).

The tissue stimulant depth was verified to be 15.0cm ±0.5cm. The same device holder described in section 6 was used for positioning the phone. The functional accessories were divided into two categories, the ones with metal components and the ones with non-metal components. For non-metallic component accessories, testing was performed on the accessory that displayed the closest proximity to the flat phantom. Each metallic component accessory, if any, was checked for uniqueness of metal component so that each is tested with the device. If multiple accessories shared an identical metal component, only the accessory that dictates the closest spacing to the body was tested. The cellular phone was tested with a headset connected to the device for all body-worn SAR measurements.

There are no body-worn accessories available for this phone at the time of testing thus the device was tested per the Supplement C testing guidelines for devices that do not have body-worn accessories. A separation distance of 25 mm between the device and the flat phantom was used for testing body-worn SAR. The chosen separation distance of 25 mm is utilized in order to support any case or holder accessories offered or to be offered by Motorola for this product. The device was tested with the front and back of the device facing the phantom. Both sides of the device were tested for Body SAR for the purpose of including the SAR evaluation for body-worn accessories that support the device with the front side facing the user.

The cellular phone was also tested in data mode operations. For these tests, a separation distance of 25 mm between the device and the flat phantom was used. The device was tested in the worst-case SAR position and channel configuration from the voice-mode body-worn testing for the data modes.

The following probe conversion factors were used on the E-Field probe(s) used for the body worn measurements:

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	SN 3184	835	6.1	6 of 11
		1810	4.9	6 of 11
		2450	4.33	6 of 11

Body-Worn, Front of Phone 25 mm from Phantom																	
f (MHz)	Mode	Battery/Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot			
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page		
835	GSM 850, CS Voice	SNN5899A	128														
			190	20.1	0.172	32.77		0.0678		0.07	0.0901		0.09				
			251														
	WCDMA 850, 12.2 kbps RMC		4132														
			4180	20.1	-0.0559	24.20		0.12		0.12	0.16		0.16				
1880	GSM 1900, CS Voice	SNN5899A	4233														
			512														
			661	20.2	-0.132	30.02		0.0735		0.08	0.115		0.12				
	WCDMA 1900, 12.2 kbps RMC		810														
			9262														
2450	802.11b, 1 Mbps	SNN5899A	9400	20.2	0.0406	24.18		0.0866		0.09	0.133		0.13				
			9538														
			1														
			6	19.6	-0.0325	17.97		0.00232		0.00	0.00466		0.00				
			11														

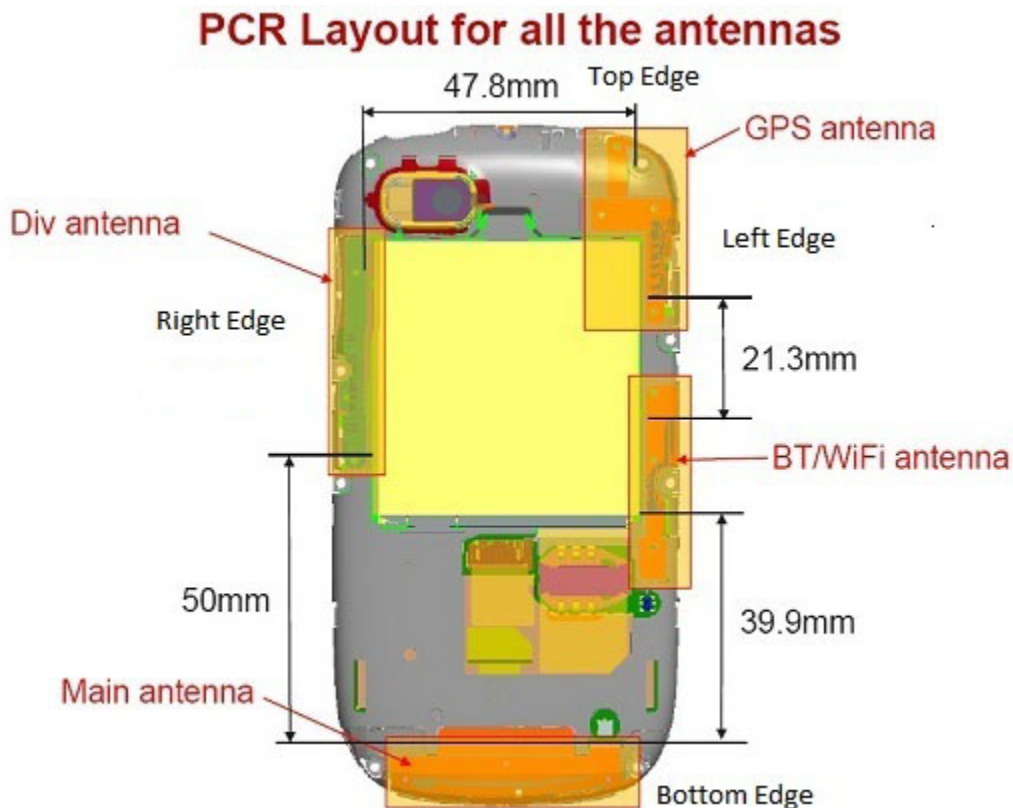
Table 5: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

Body-Worn, Back of Phone 25 mm from Phantom																
f (MHz)	Mode	Battery/Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot		
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page	
835	GSM 850, CS Voice	SNN5899A	128													
			190	20.1	0.256	32.77		0.117		0.12	0.159		0.16			
			251													
	GPRS 850, PS Data 4 Uplots		190	20.1	-0.319	27.92		0.25		0.27	0.335		0.36	5x5x7	67	
	EDGE 850, PS Data 4 Uplots		190	20.1	0.394	22.86		0.0872		0.09	0.117		0.12			
	WCDMA 850, 12.2 kbps RMC		4132													
			4180	20.1	-0.0606	24.20		0.195		0.20	0.265		0.27	5x5x7	68	
1880	GSM 1900, CS Voice	SNN5899A	4233													
			512													
			661	20.2	0.105	30.02		0.0854		0.09	0.133		0.13			
	GPRS 190, PS Data 4 Uplots		661	20.6	-0.367	25.07		0.0845		0.09	0.131		0.14	5x5x7	69	
	EDGE 190, PS Data 4 Uplots		661	19.5	-0.0165	22.84		0.0562		0.06	0.0863		0.09			
	WCDMA 1900, 12.2 kbps RMC		9262													
			9400	20.2	0.032	24.18		0.108		0.11	0.166		0.17	5x5x7	70	
2450	802.11b, 1 Mbps	SNN5899A	9538													
			1	20.0	-0.0167	17.73		0.0215		0.02	0.0372		0.04	5x5x7	71	
			6	19.6	-0.178	17.97		0.0179		0.02	0.032		0.03			
	11		20.0	0.0605	17.83		0.0193		0.02	0.0356		0.04				
	802.11b, 5.5 Mbps		1	20.0	-0.108	18.91		0.0188		0.02	0.0331		0.03			
			6	20.0	0.163	19.12		0.019		0.02	0.0333		0.03			
	802.11b, 11 Mbps		11	20.0	0.143	19.04		0.0178		0.02	0.0319		0.03			
			1	19.0	-0.125	19.01		0.0194		0.02	0.0343		0.04			
			6	19.0	-0.353	19.17		0.0193		0.02	0.0345		0.04			
11		19.1	-0.0048	18.89		0.0184		0.02	0.0328		0.04					

Table 6: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

6.3 Mobile Hotspot Test Results

The DUT is capable of functioning as a Wi-Fi to Cellular mobile hotspot. Additional SAR testing was performed according to the test guidelines provided per FCC KDB 941225 D06. Testing was performed with a separation of 1 cm between the DUT and the “flat” phantom. The DUT was positioned for SAR tests with the front and back surfaces facing the phantom, and also with the edges facing the phantom in which the transmitting antenna is less than 2.5 cm from the edge. The diversity antenna is a receive diversity only.



Mobile Hotspot Edges/Surfaces for SAR testing						
Mode	Top	Bottom	Left	Right	Front	Back
GSM/WCDMA	NO	YES	YES	YES	YES	YES
Wi-Fi	NO	NO	YES	NO	YES	YES

The SAR results shown in tables 8 through 12 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to [6]. Also shown are the temperature of the simulated tissue after the test, the measured drift, the measured conducted output power levels, power reduction amount (when applicable), the measured SAR corrected for probe calibration (when applicable), and the extrapolated SAR. The exact method of extrapolation is:

$$Extrapolated\ SAR = (Measured\ or\ Corrected\ SAR) * 10^{(-drift/10)}$$

The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This

extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test.

The test conditions that produced the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 5. All other test conditions measured lower SAR values than those included in Appendix 5.

The simulated tissue depth was verified to be 15.0 cm ± 0.5 cm. The same device holder described in section 6 was used for positioning the phone.

The following probe conversion factors were used on the E-Field probe(s) used for the Mobile Hotspot Mode measurements:

Description	Serial Number	f (MHz)	Conversion Factor	Cal Cert pg #
E-Field Probe ES3DV3	SN 3184	835	6.1	6 of 11
		1810	4.9	6 of 11
		2450	4.33	6 of 11

Mobile Hotspot Mode; Front Surface of Phone 10mm from Phantom																
f (MHz)	Mode	Battery/Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot		
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page	
835	GPRS 850, PS Data 3 Uplots	SNN5899A	128													
			190	19.5	-0.205	27.92			0.328		0.34	0.432		0.45		
			251													
	4132															
	WCDMA 850, 12.2 kbps RMC		4180	20.0	-0.0241	24.20			0.336		0.34	0.446		0.45		
1880	GPRS 1900, PS Data 3 Uplots	512														
		661	19.4	-0.321	25.07			0.236		0.25	0.385		0.41			
		810														
	WCDMA 1900, 12.2 kbps RMC	9262														
		9400	20.0	-0.116	24.18			0.333		0.34	0.546		0.56			
2450	802.11b, 1 Mbps	9538														
		1														
		6	20.0	-0.0413	17.97			0.00206		0.00	0.0135		0.01			
			11													

Table 8: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot, Back Surface of Phone 10 mm from Phantom																
f (MHz)	Mode	Battery/Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot		
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page	
835	GPRS 850, PS Data 4 Uplots	SNN5899A	128													
			190	19.5	0.0205	27.92			0.545		0.55	0.768			5x5x7	73
			251													
	WCDMA 850, 12.2 kbps RMC		4132	20.0	0.084	24.09			0.683		0.68	0.944		0.94		
			4180	20.0	0.0122	24.20			0.708		0.71	0.983		0.98	5x5x7	74
1880	GPRS 1900, PS Data 4 Uplots	4233	20.0	-0.0533	24.08			0.68		0.69	0.948		0.96			
		512														
		661	19.5	-0.143	25.07			0.303		0.31	0.49		0.51			
	WCDMA 1900, 12.2 kbps RMC	810														
		9262	20.0	0.0455	24.11			0.438		0.44	0.767		0.77			
2450	802.11b, 1 Mbps	9400	20.0	0.0329	24.18			0.471		0.47	0.805		0.81	5x5x7	75	
		9538	20.0	0.0177	23.88			0.44		0.44	0.749		0.75			
		1	20.0	0.0104	17.73			0.111		0.11	0.238		0.24	5x5x7	76	
	802.11b, 5.5 Mbps	6	20.0	0.00549	17.97			0.0927		0.09	0.198		0.20			
		11	20.0	-0.0501	17.83			0.0915		0.09	0.196		0.20			
		1	19.1	-0.0596	18.91			0.106		0.11	0.227		0.23			
		6	20.0	-0.0702	19.12			0.0949		0.10	0.202		0.21			
802.11b, 11 Mbps	11	20.0	-0.137	19.04			0.084		0.09	0.176		0.18				
	1	19.0	0.167	19.01			0.0883		0.09	0.186		0.19				
	6	19.0	-0.153	19.17			0.0892		0.09	0.188		0.19				
			11	19.2	-0.15	18.89			0.0848		0.09	0.182		0.19		

Table 9: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot, Left Edge of Phone 10 mm from Phantom																
f (MHz)	Mode	Battery/Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot		
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page	
835	GPRS 850, PS Data 3 Uplots	SNN5899A	128													
			190	20.1	-0.382	27.92			0.218		0.24	0.314		0.34		
			251													
	WCDMA 850, 12.2 kbps RMC		4132													
			4180	20.0	0.0013	24.20			0.259		0.26	0.373		0.37		
1880	GPRS 1900, PS Data 3 Uplots	4233														
		512														
		661	20.0	-0.301	25.07			0.0987		0.11	0.174		0.19			
	WCDMA 1900, 12.2 kbps RMC	810														
		9262														
2450	802.11b, 1 Mbps	9400	20.0	-0.0491	24.18			0.139		0.14	0.24		0.24			
		9538														
		1														
		6	19.6	0.0105	17.97			0.078		0.08	0.163		0.16			
			11													

Table 10: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot, Right Edge of Phone 10 mm from Phantom																
f (MHz)	Mode	Battery/Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot		
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page	
835	GPRS 850, PS Data 3 Uplots	SNN5899A	128													
			190	19.5	-0.0383	27.92		0.271		0.27	0.417		0.42			
			251													
	WCDMA 850, 12.2 kbps RMC		4132													
			4180	20.1	-0.131	24.20		0.223		0.23	0.317		0.33			
1880	GPRS 1900, PS Data 3 Uplots	512														
		661	20.0	-0.312	25.07		0.0853		0.09	0.143		0.15				
		810														
	WCDMA 1900, 12.2 kbps RMC	9262														
		9400	20.0	-0.0401	24.18		0.117		0.12	0.196		0.20				
		9538														

Table 11: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

Mobile Hotspot Mode; Bottom Edge of Phone 10mm from Phantom															
f (MHz)	Mode	Battery/Accessory	Channel	Temp (°C)	Drift (dB)	DUT Power		10 g SAR value			1 g SAR value			Test Plot	
						Measured (dBm)	Power Reduction (dB)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Measured (W/kg)	Corrected (W/kg)	Extrapolated (W/kg)	Grid	Plot Page
835	GPRS 850, PS Data 3 Uplots	SNN5899A	128												
			190	19.5	-0.575	27.92		0.0493		0.06	0.0845		0.10		
			251												
	WCDMA 850, 12.2 kbps RMC		4132												
			4180	20.1	-0.0639	24.20		0.0536		0.05	0.0902		0.09		
1880	GPRS 1900, PS Data 3 Uplots	512													
		661	19.3	-0.0582	25.07		0.276		0.28	0.507		0.51	5x5x7	77	
		810													
	WCDMA 1900, 12.2 kbps RMC	9262													
		9400	20.0	-0.021	24.18		0.351		0.35	0.634		0.64			
		9538													

Table 12: SAR measurement results at the highest possible output power, measured against the ICNIRP and ANSI SAR Limit.

6.4 Description and Evaluation of Simultaneous Transmitters

Per "SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas" (FCC KDB pub. 648474), the necessity of stand-alone and simultaneous SAR testing was evaluated for the licensed and unlicensed transmitters of the device under test.

By device design the GSM and WCDMA transmitters may operate simultaneously with either the Wi-Fi 802.11 transmitter or the Bluetooth transmitter. The separation distance between the Wi-Fi 802.11/Bluetooth antenna and the main antenna is 1.76 cm. Pictorial representation of the antenna locations and separation distances are given in section 6.3.

The Bluetooth transmitter of the device under test can be excluded from stand-alone and simultaneous SAR evaluation, per the **bolded** requirements from FCC KDB 648474, as follows. Note that Bluetooth mode is not intended for use in configurations against the head or during mobile hotspot operation, and this evaluation considers only the body-worn configuration.

1. The highest output conducted power measured for Bluetooth on the device under test is 9.06 mW
2. The separation distance between the Bluetooth antenna and the GSM/WCDMA antenna is 3.99 cm

The Wi-Fi and the Bluetooth cannot transmit simultaneously, so there is no co-location test requirement for Wi-Fi and Bluetooth. GSM supports voice and data transmission, though not simultaneously. WCDMA supports voice and data transmission simultaneously.

Description of Simultaneous Transmit Capabilities				
Transmitter Combinations		Scenario Supported?	Supported for Mobile Hotspot?	Notes
#1	GSM (CS Voice) + GSM (PS Data)	No	No	DUT system architecture does not support simultaneous voice and data (except on WCDMA), multiple voice channels, or multiple data channels during a single session on the cellular network.
#2	GSM (CS Voice) + WCDMA (Data)	No	No	
#3	WCDMA (Voice) + GSM (PS Data)	No	No	
#4	GSM (PS Data) + WCDMA (Data)	No	No	
#5	GSM (CS Voice) + WCDMA (Voice)	No	No	
#6	WCDMA (Voice) + WCDMA (Data)	Yes	Yes	Inherent ability of WCDMA protocol to allow Voice and Data on same Tx
#7	GSM (CS Voice) + Wi-Fi	Yes	No	Supported for voice plus background data.
#8	WCDMA (Voice) + Wi-Fi	Yes	No	
#9	GSM (PS Data) + Wi-Fi	Yes	Yes	Supported for mobile hotspot operation.
#10	WCDMA (Data) + Wi-Fi	Yes	Yes	

For the transmitters requiring stand-alone SAR testing (GSM, WCDMA, and Wi-Fi 802.11), the KDB guidelines direct that if the sum of the 1 g SAR measured for the simultaneously transmitting antennas is less than the SAR limit, SAR measurement for simultaneous transmission is not required. Further, if the SAR-to-peak-location separation ratio for two simultaneously transmitting antennas is less than 0.3 then SAR measurement for simultaneous transmission is likewise not required. Evaluations of the head, body, and mobile hotspot simultaneous SAR summations for the worst-case SAR transmitter configurations are presented in the tables below.

The following SAR summations for simultaneous evaluation are provided to demonstrate a GSM or WCDMA voice link with a simultaneous data link on Wi-Fi.

Evaluations for Simultaneous SAR, Head and Body positions									
Transmitter Stand-Alone 1 g SAR Values (W/kg)						1 g SAR Summations (W/kg)			
Transmitter Combination						#7	#7	#8	#8
Band Position	GSM 850	GSM 1900	WCDMA 850	WCDMA 1900	Wi-Fi 2450	GSM 850 + Wi-Fi 2450	GSM 1900 + Wi-Fi 2450	WCDMA 850 + Wi-Fi 2450	WCDMA 1900 + Wi-Fi 2450
Left Head Cheek	0.25	0.44	0.34	0.58	0.15	0.40	0.59	0.49	0.73
Left Head 15° Tilt	0.18	0.20	0.25	0.25	0.02	0.20	0.22	0.27	0.27
Right Head Cheek	0.29	0.48	0.40	0.57	0.03	0.32	0.51	0.43	0.60
Right Head 15° Tilt	0.19	0.20	0.27	0.25	0.00	0.19	0.20	0.27	0.25
Body Worn, Front of Phone 15 mm from Phantom	0.09	0.12	0.16	0.13	0.00	0.09	0.12	0.16	0.13
Body Worn, Back of Phone 15 mm from Phantom	0.36	0.14	0.27	0.17	0.04	0.40	0.18	0.31	0.21

The following Mobile Hotspot (10 mm separation) position SAR summations for simultaneous evaluation are provided to demonstrate a data link (over GSM or WCDMA) with a simultaneous data link on Wi-Fi (to client devices).

Evaluations for Simultaneous SAR, Mobile Hotspot (10 mm separation) positions Mobile Hotspot functionality enabled									
Transmitter Stand-Alone 1 g SAR Values (W/kg)						1 g SAR Summations (W/kg)			
Transmitter Combination						#9	#9	#10	#10
Band Position	GSM 850	GSM 1900	WCDMA 850	WCDMA 1900	Wi-Fi 2450	GSM 850 + Wi-Fi 2450	GSM 1900 + Wi-Fi 2450	WCDMA 850 + Wi-Fi 2450	WCDMA 1900 + Wi-Fi 2450
Bottom Edge of DUT 10 mm from Phantom	0.10	0.51	0.09	0.64	N/A	N/A	N/A	N/A	N/A
Right Edge of DUT 10 mm from Phantom	0.42	0.15	0.33	0.20	N/A	N/A	N/A	N/A	N/A
Left Edge of DUT 10 mm from Phantom	0.34	0.19	0.37	0.24	0.16	0.50	0.35	0.53	0.40
Front Surface of DUT 10 mm from Phantom	0.45	0.41	0.45	0.56	0.01	0.46	0.42	0.46	0.57
Back Surface of DUT 10 mm from Phantom	0.77	0.51	0.98	0.81	0.24	1.01	0.75	1.22	1.05

References

- [1] CENELEC, en62209-1:2006 “Human Exposure to Radio Frequency Fields From Hand - Held and Body - Mounted Wireless Communication Devices – Human Models, Instrumentation, and Procedures”
- [2] CENELEC, en50360:2001 “Product standard to demonstrate the compliance of mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300MHz – 3GHz)”.
- [3] ANSI / IEEE, C95.1 1999 Edition “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300GHz”
- [4] FCC OET Bulletin 65 Supplement C 01-01
- [5] IEEE 1528 2003 Edition “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”
- [6] ICNIRP Guidelines “Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz)”

Appendix 1

SAR distribution comparison for the system accuracy verification

Appendix 1

SAR distribution comparison for the system accuracy verification

Test Laboratory: Motorola Mobility 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:436

Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -26.15 dB Sim.Temp@SPC = 20.5°C Room Temp @ SPC = 21.0°C

Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Validation *HEAD Tissue* ; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.92 \text{ mho/m}$; $\epsilon_r = 41.5$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.11, 6.11, 6.11); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1235;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm

Maximum value of SAR (measured) = 2.16 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

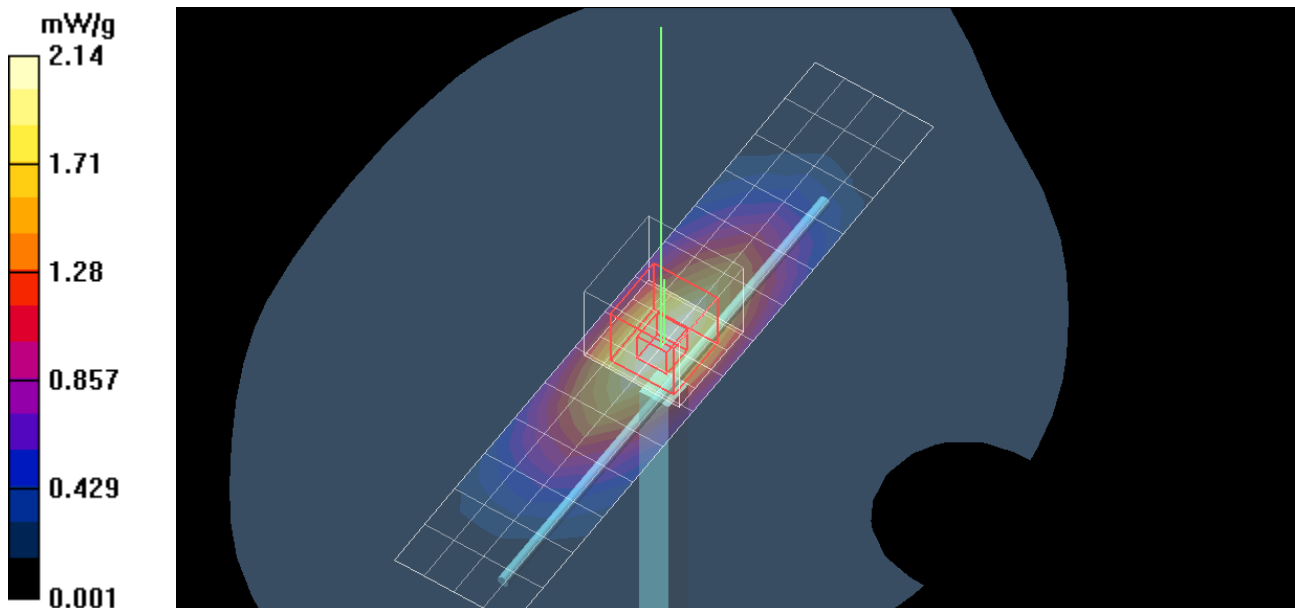
Reference Value = 49.0 V/m; Power Drift = -0.037 dB

Peak SAR (extrapolated) = 2.97 W/kg

SAR(1 g) = 2 mW/g; SAR(10 g) = 1.31 mW/g

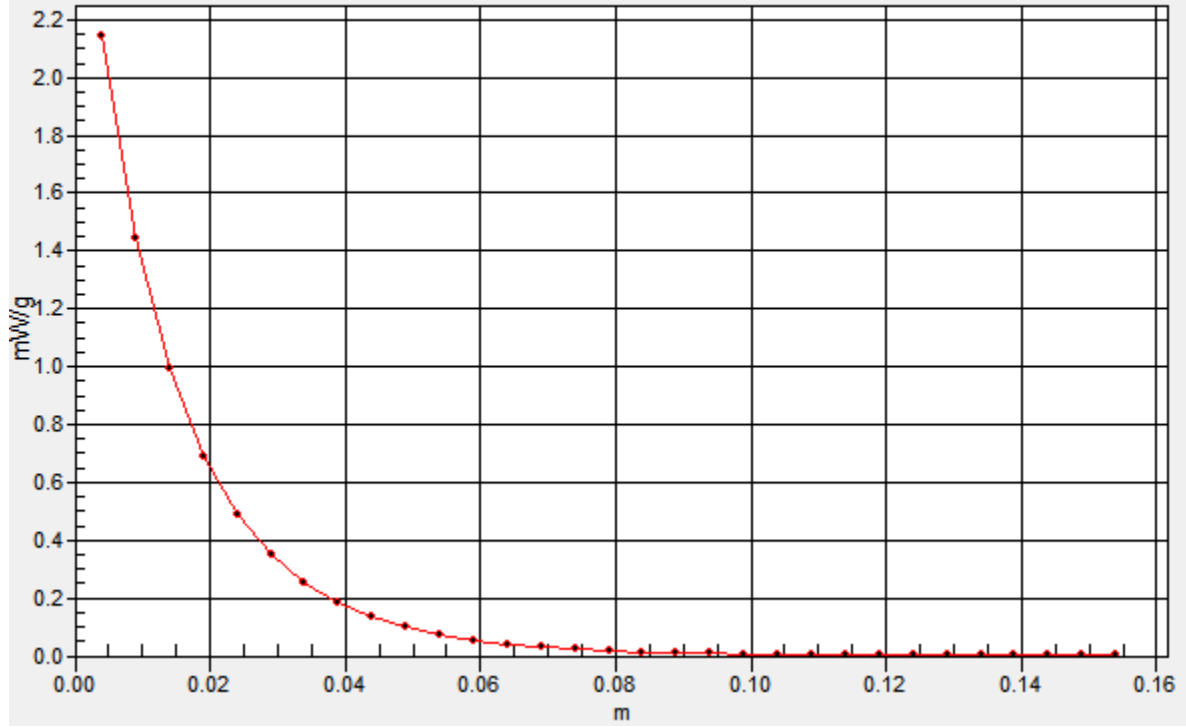
Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 2.14 mW/g



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:436

Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -25.62 dB Sim.Temp@SPC = 20.0C Room Temp @ SPC = 21.0C

Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Validation *HEAD Tissue* ; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.91 \text{ mho/m}$; $\epsilon_r = 41.2$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.11, 6.11, 6.11); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1235;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm

Maximum value of SAR (measured) = 2.03 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 47.7 V/m; Power Drift = -0.008 dB

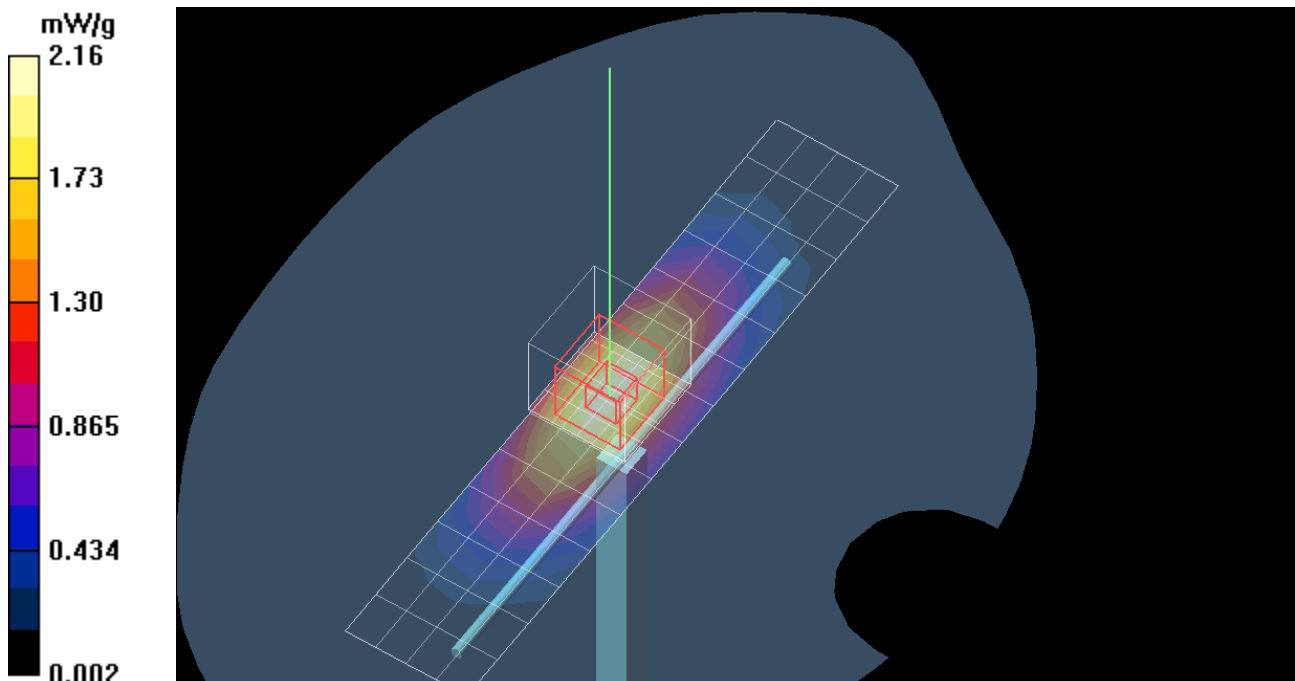
Peak SAR (extrapolated) = 2.97 W/kg

SAR(1 g) = 2 mW/g; SAR(10 g) = 1.31 mW/g

Maximum value of SAR (measured) = 2.17 mW/g

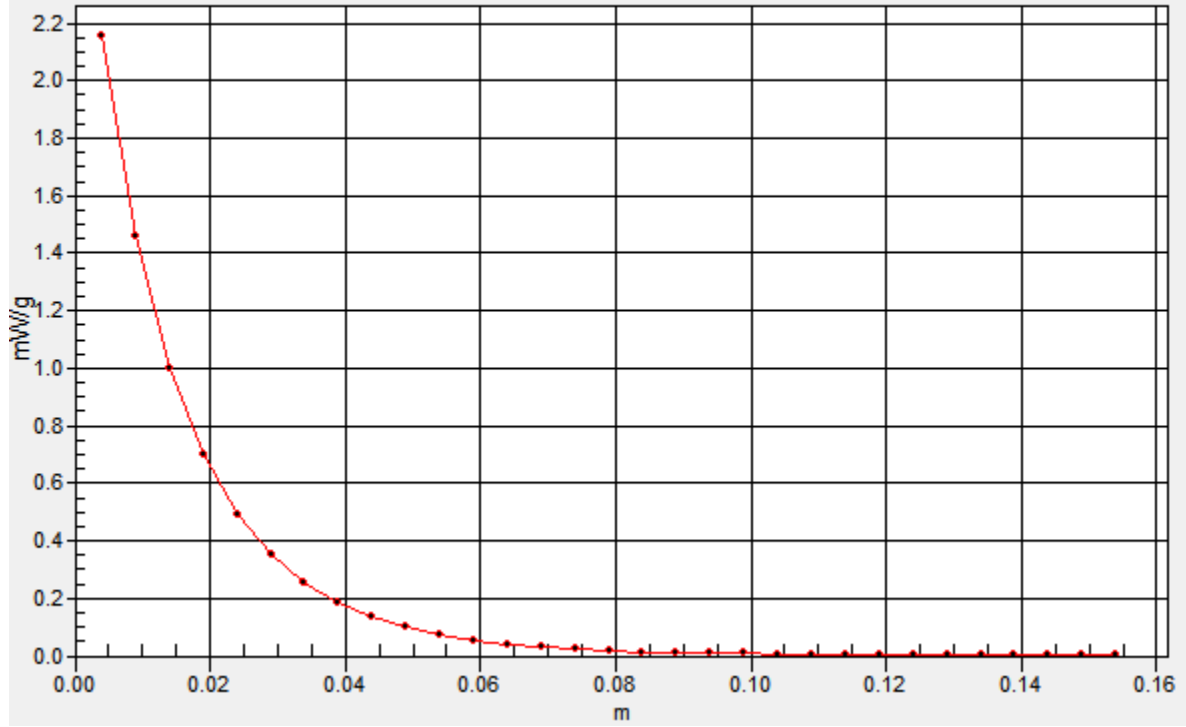
Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 2.16 mW/g



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:436

Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -25.7 dB [Sim.Temp@SPC](#) = 20 Room Temp @ SPC = 21.4

Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Validation *HEAD Tissue* ; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.9 \text{ mho/m}$; $\epsilon_r = 40.2$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.11, 6.11, 6.11); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1235;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm

Maximum value of SAR (measured) = 2.08 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

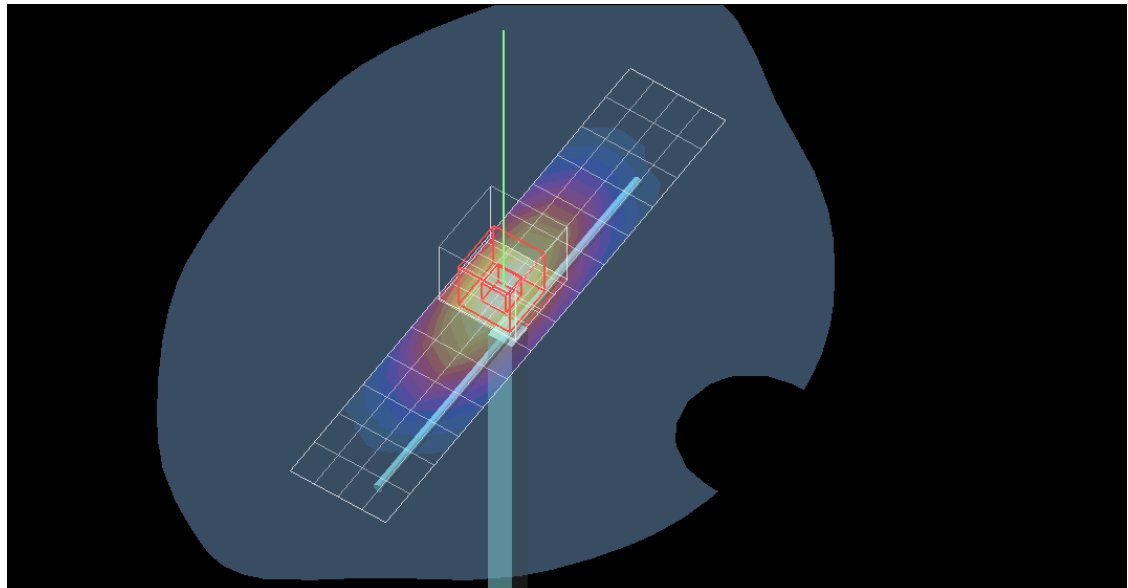
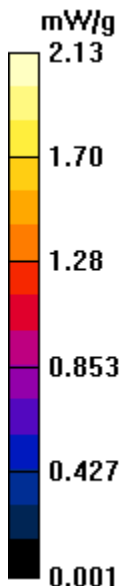
Reference Value = 48.9 V/m; Power Drift = -0.036 dB

Peak SAR (extrapolated) = 2.92 W/kg

SAR(1 g) = 1.97 mW/g; SAR(10 g) = 1.29 mW/g

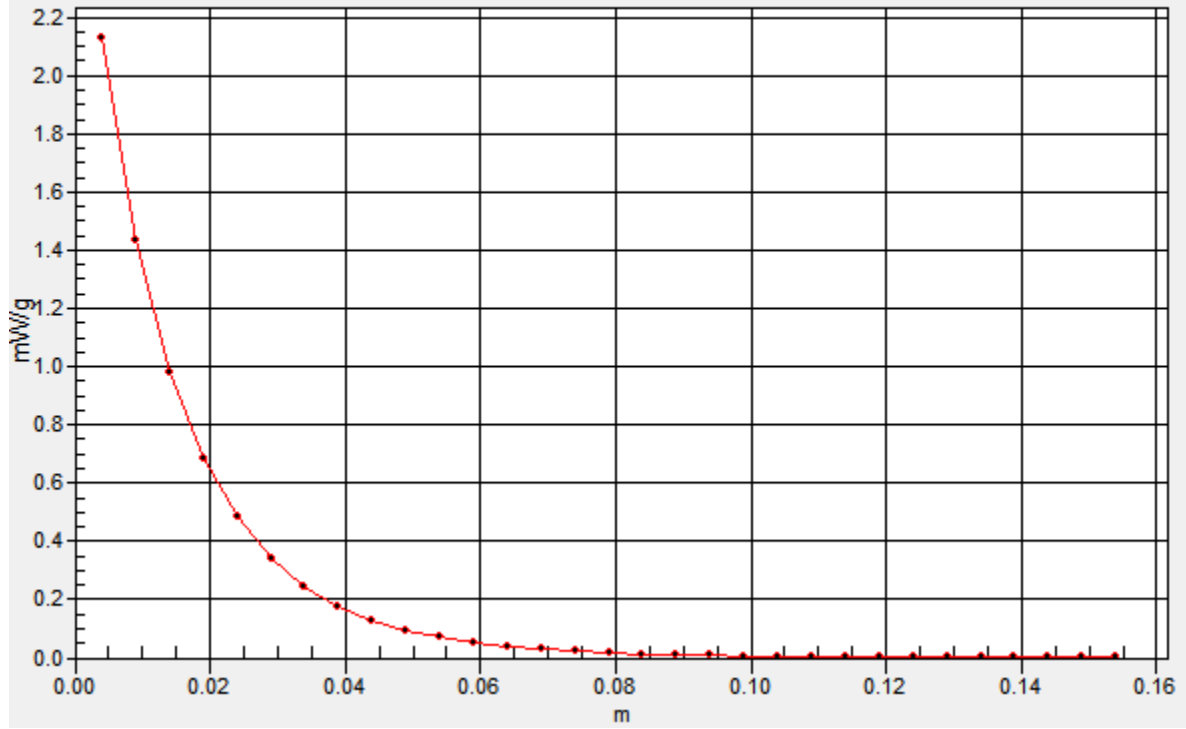
Maximum value of SAR (measured) = 2.13 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:271

Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -23.65 dB Sim.Temp@SPC = 20.6°C Room Temp @ SPC = 21.0°C

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: Validation *HEAD Tissue* ; Medium parameters used: $f = 1800 \text{ MHz}$; $\sigma = 1.37 \text{ mho/m}$; $\epsilon_r = 38.4$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(5.11, 5.11, 5.11); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 6.47 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 81.4 V/m; Power Drift = -0.005 dB

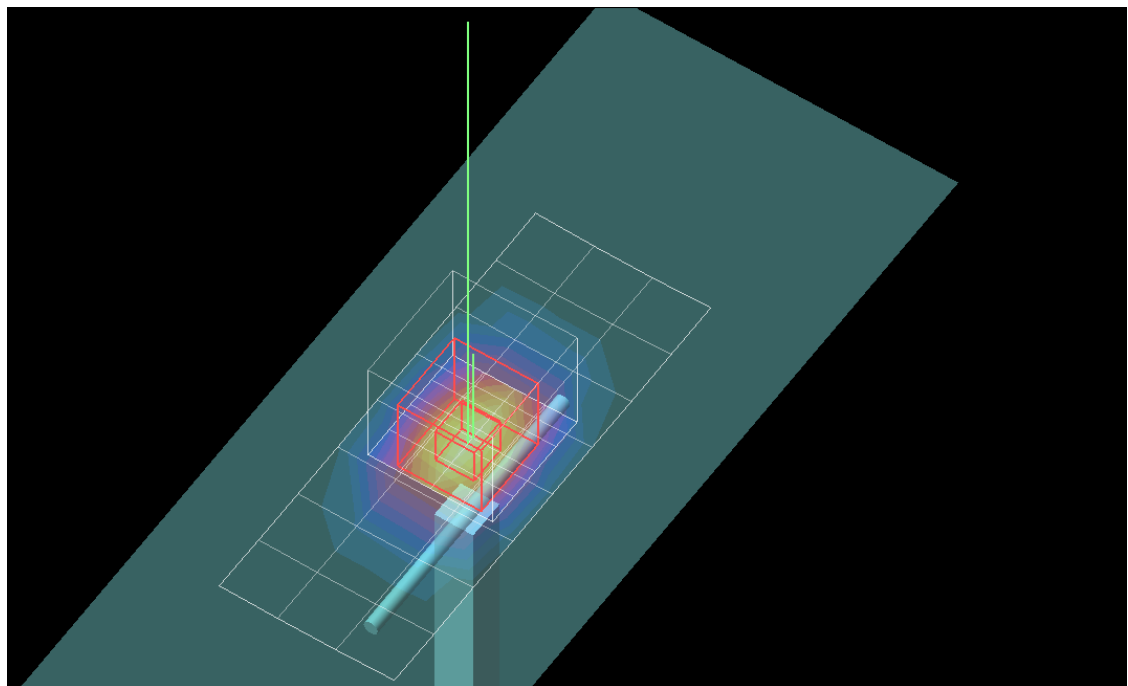
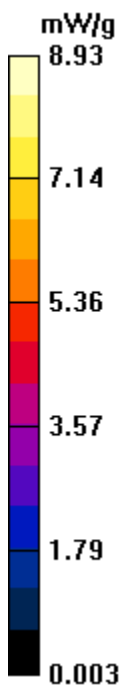
Peak SAR (extrapolated) = 14.4 W/kg

SAR(1 g) = 7.89 mW/g; SAR(10 g) = 4.18 mW/g

Maximum value of SAR (measured) = 8.80 mW/g

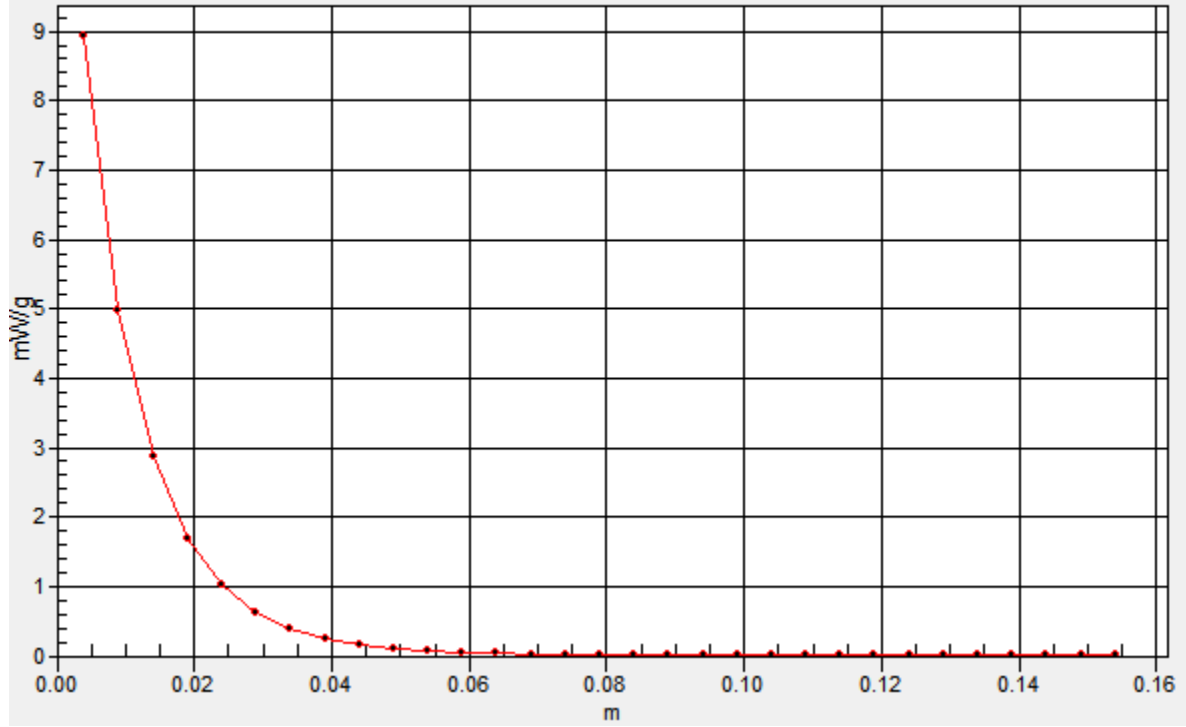
Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 8.93 mW/g



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:271

Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -24.31 dB [Sim.Temp@SPC](#) = 20.1C Room Temp @ SPC = 21.3C

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: Validation *HEAD Tissue* ; Medium parameters used: $f = 1800$ MHz; $\sigma = 1.36$ mho/m; $\epsilon_r = 38.3$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(5.11, 5.11, 5.11); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm

Maximum value of SAR (measured) = 8.16 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 78.4 V/m; Power Drift = 0.011 dB

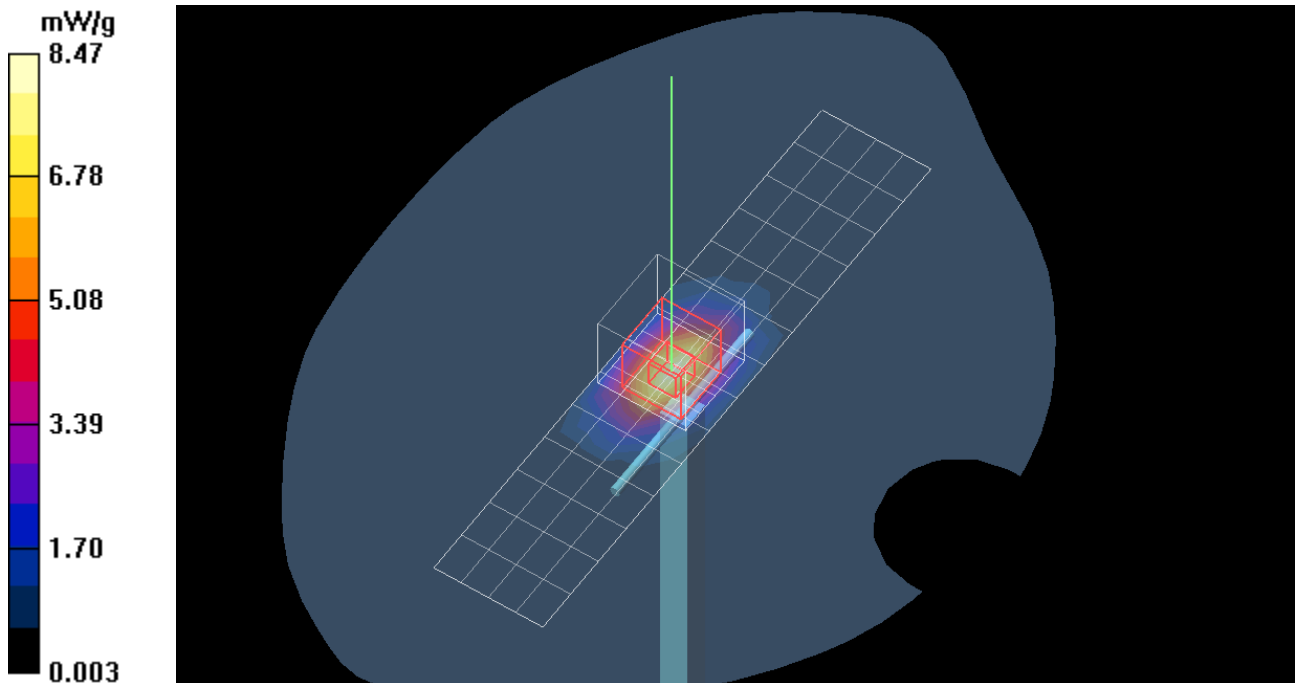
Peak SAR (extrapolated) = 13.9 W/kg

SAR(1 g) = 7.55 mW/g; SAR(10 g) = 3.97 mW/g

Maximum value of SAR (measured) = 8.50 mW/g

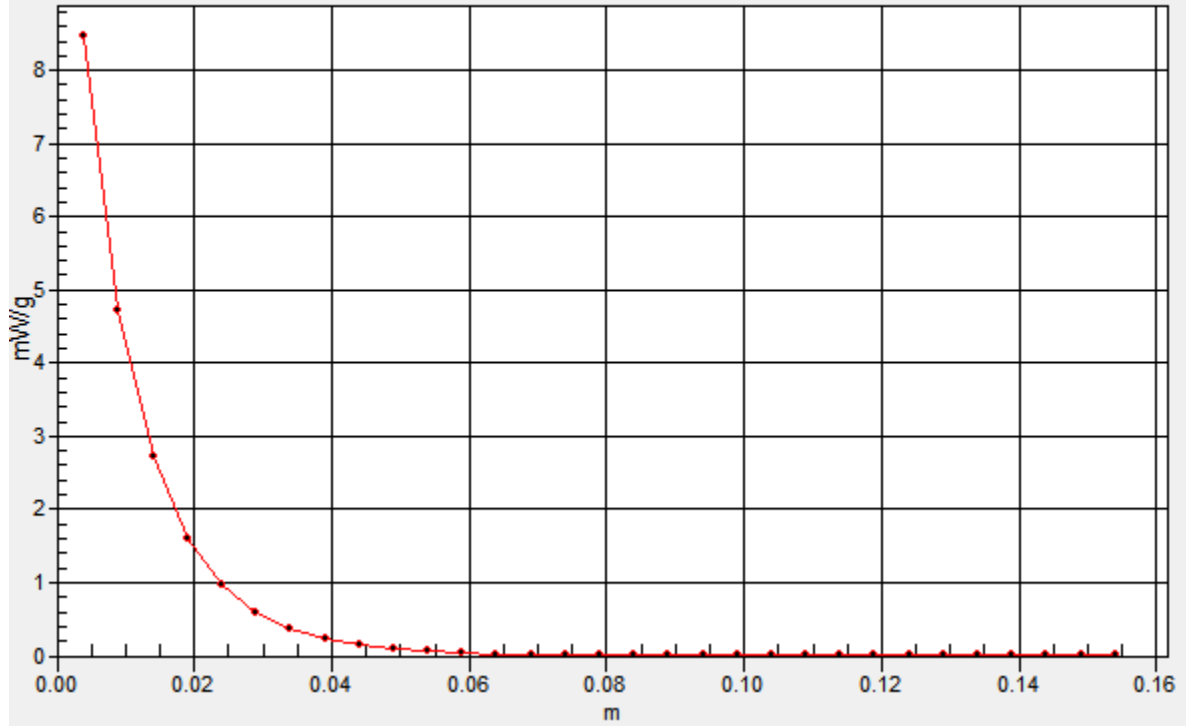
Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 8.47 mW/g



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:271

Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -24.21 dB [Sim.Temp@SPC](#) = 20.5 Room Temp @ SPC = 21.4

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: Validation *HEAD Tissue* ; Medium parameters used: $f = 1800$ MHz; $\sigma = 1.38$ mho/m; $\epsilon_r = 38.3$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(5.11, 5.11, 5.11); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm

Maximum value of SAR (measured) = 7.43 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 66.9 V/m; Power Drift = -0.143 dB

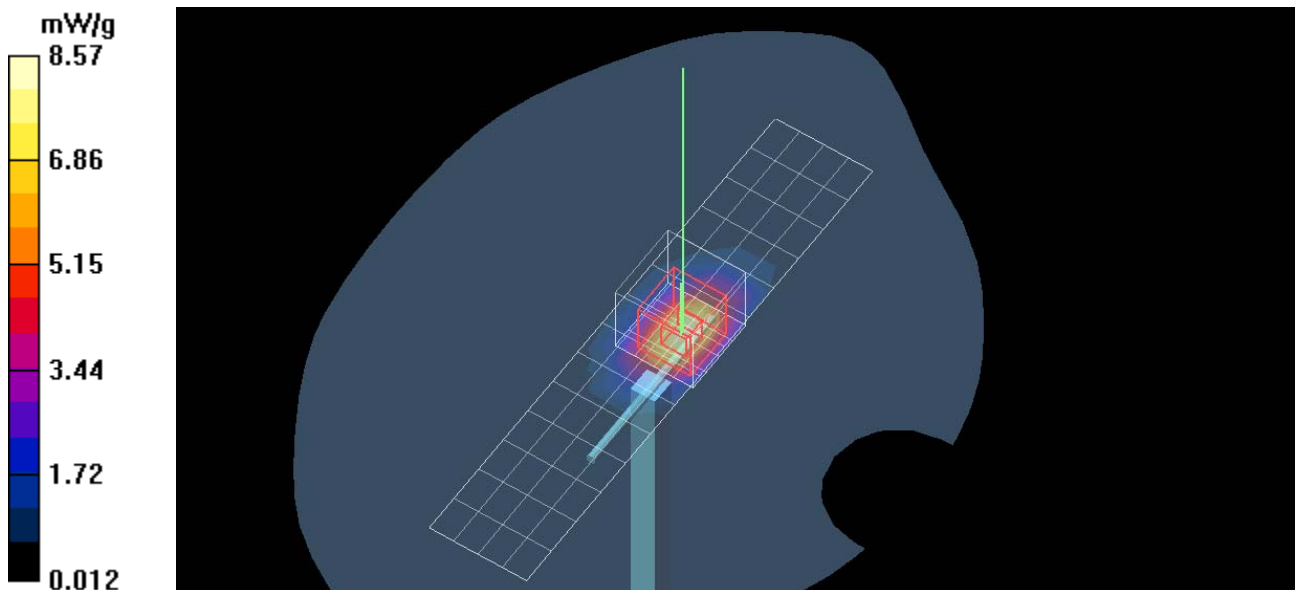
Peak SAR (extrapolated) = 14.0 W/kg

SAR(1 g) = 7.69 mW/g; SAR(10 g) = 4.07 mW/g

Maximum value of SAR (measured) = 8.62 mW/g

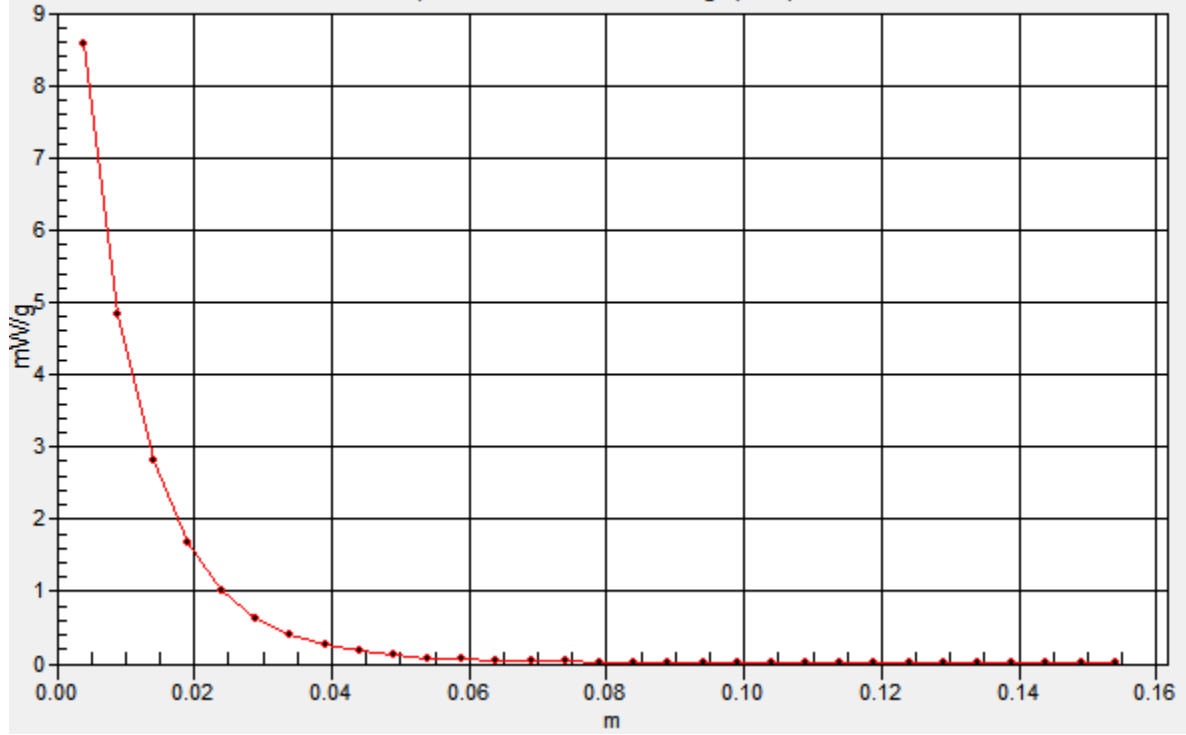
Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 8.57 mW/g



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 2450 MHz System Performance Check

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:863

Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -27.77 dB [Sim.Temp@SPC](#) = 20.8C Room Temp @ SPC = 21.2C

Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: Validation *HEAD Tissue* ; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.85$ mho/m; $\epsilon_r = 38.1$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.48, 4.48, 4.48); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm

Maximum value of SAR (measured) = 12.1 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 68.7 V/m; Power Drift = -0.183 dB

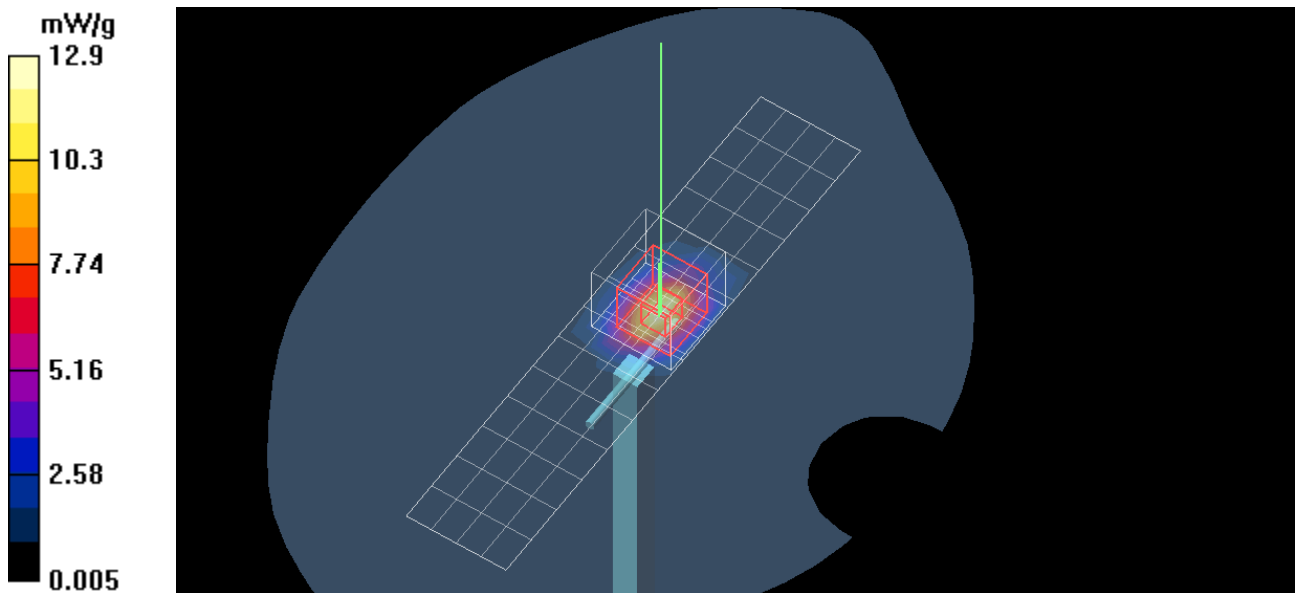
Peak SAR (extrapolated) = 24.0 W/kg

SAR(1 g) = 11.5 mW/g; SAR(10 g) = 5.31 mW/g

Maximum value of SAR (measured) = 13.0 mW/g

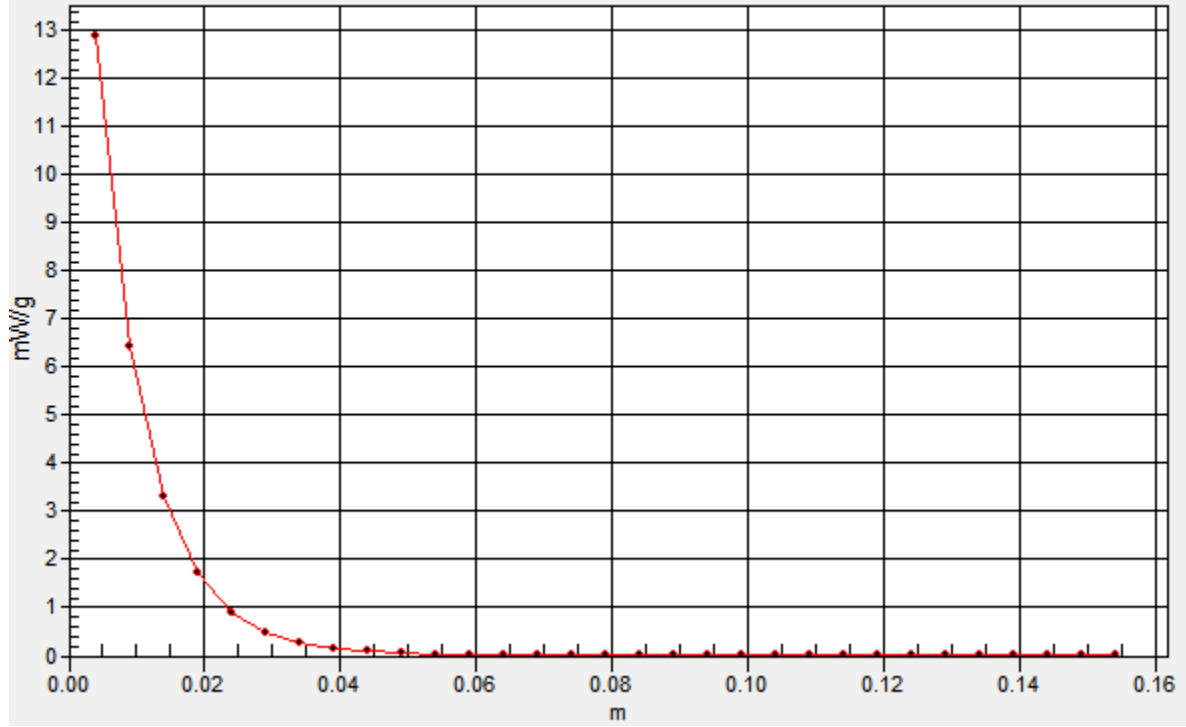
Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 12.9 mW/g



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 2450 MHz system Performance Check

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:740

Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -21.80 dB [Sim.Temp@SPC](#) = 20.5 Room Temp @ SPC = 21.4

Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: Validation *HEAD Tissue* ; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.86$ mho/m; $\epsilon_r = 38.1$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.48, 4.48, 4.48); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (5x15x1): Measurement grid: dx=10mm, dy=15mm

Maximum value of SAR (measured) = 11.1 mW/g

Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 67.8 V/m; Power Drift = -0.174 dB

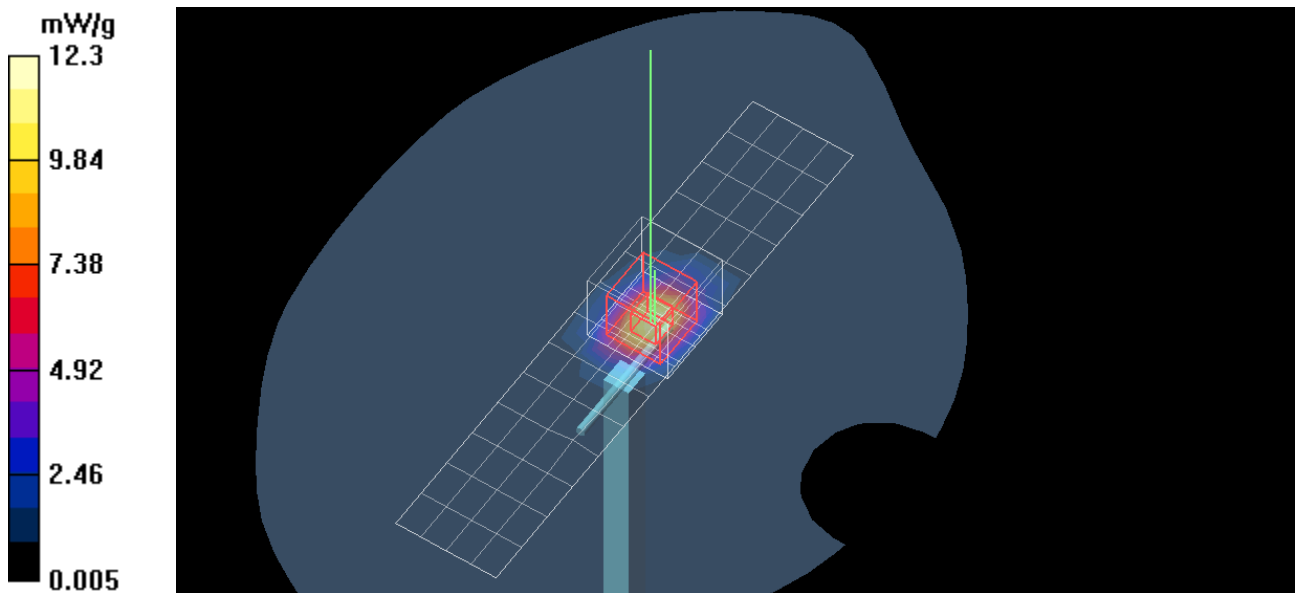
Peak SAR (extrapolated) = 23.1 W/kg

SAR(1 g) = 10.9 mW/g; SAR(10 g) = 5.03 mW/g

Maximum value of SAR (measured) = 12.1 mW/g

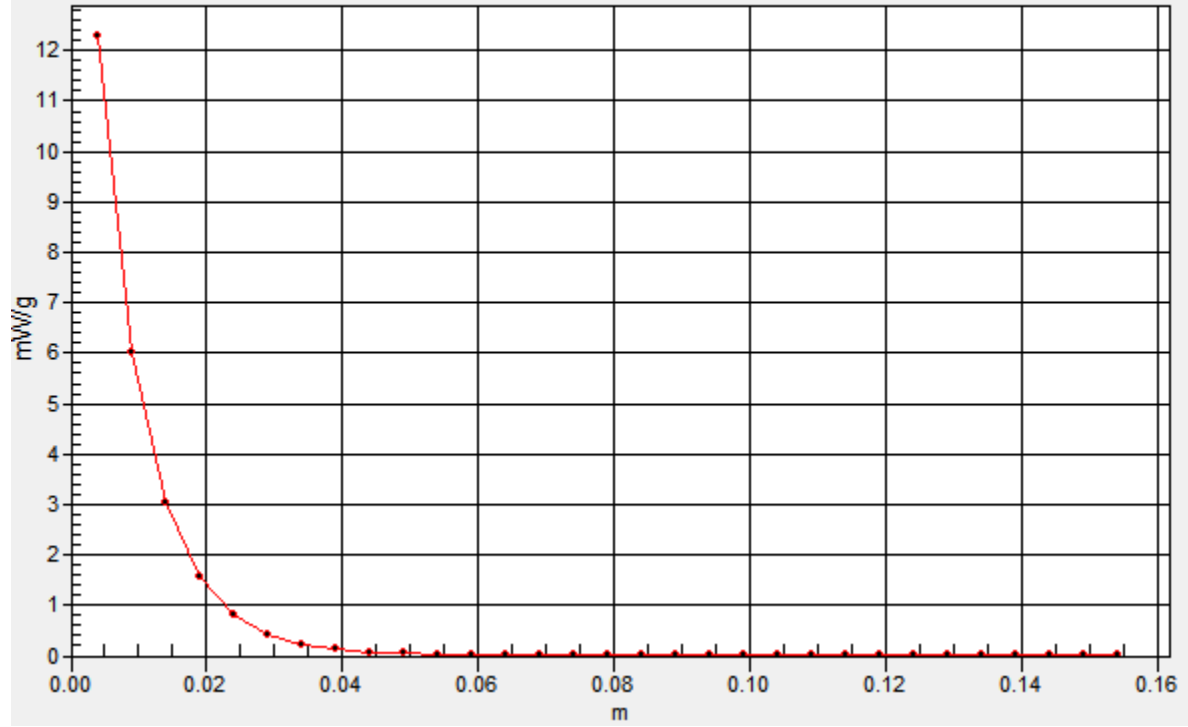
Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 12.3 mW/g



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:436

Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -20.25 dB [Sim.Temp@SPC](#) = 20.1°C Room Temp @ SPC = 21.1°C

Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue* ; Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.98 \text{ mho/m}$; $\epsilon_r = 55$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.1, 6.1, 6.1); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.95 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 48.1 V/m; Power Drift = -0.105 dB

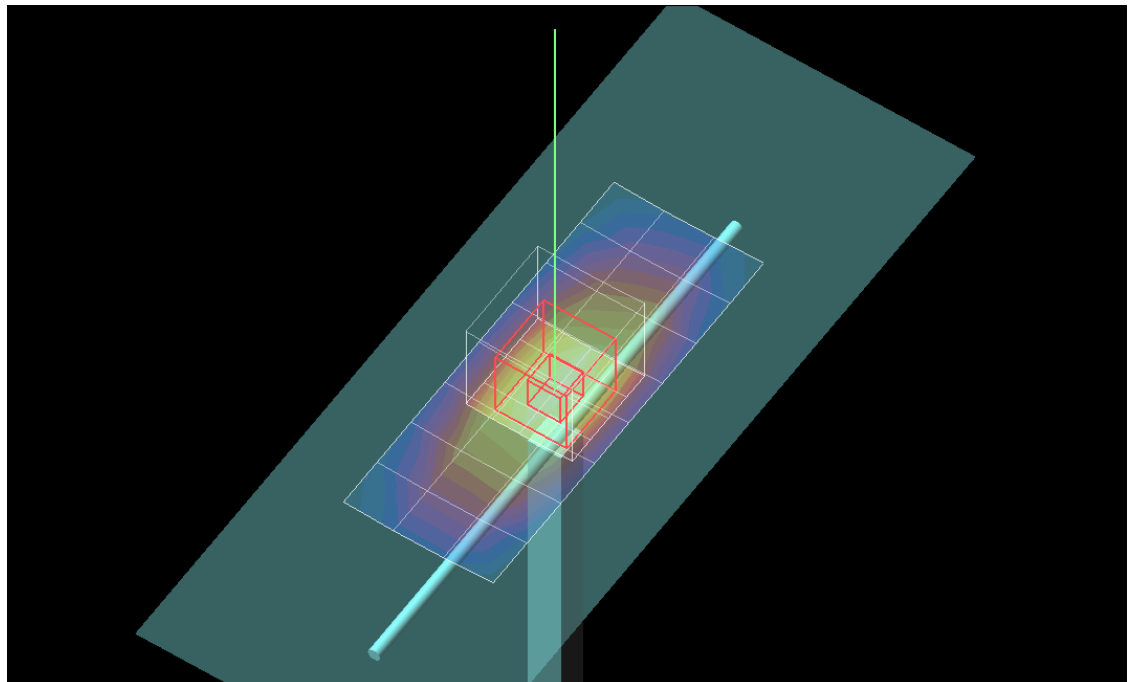
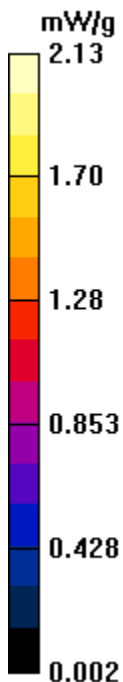
Peak SAR (extrapolated) = 2.94 W/kg

SAR(1 g) = 1.99 mW/g; SAR(10 g) = 1.31 mW/g

Maximum value of SAR (measured) = 2.16 mW/g

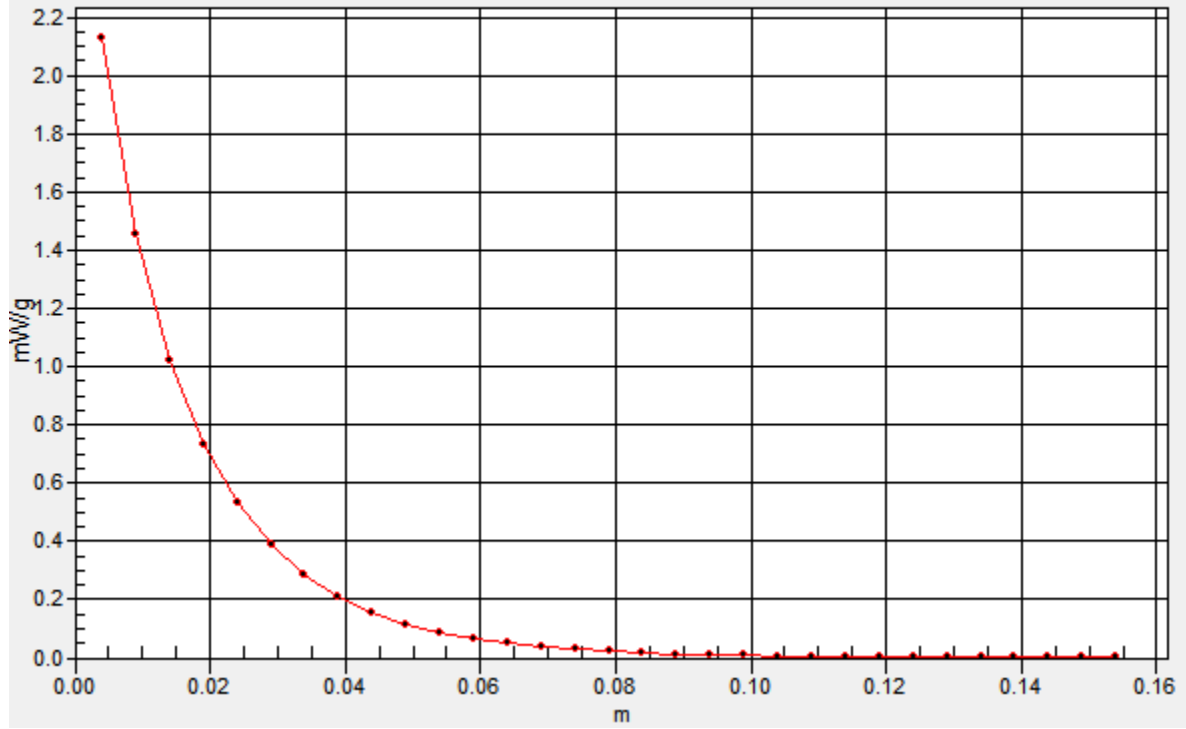
Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 2.13 mW/g



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:436

Procedure Notes: PM1 Power = 200mW Refl.Pwr PM3 = -20.47 dB [Sim.Temp@SPC](#) = 19.6 Room Temp @ SPC = 21.1

Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Low Freq Body; Medium parameters used: $f = 835$ MHz; $\sigma = 0.97$ mho/m; $\epsilon_r = 54.1$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.1, 6.1, 6.1); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.95 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 47.3 V/m; Power Drift = 0.006 dB

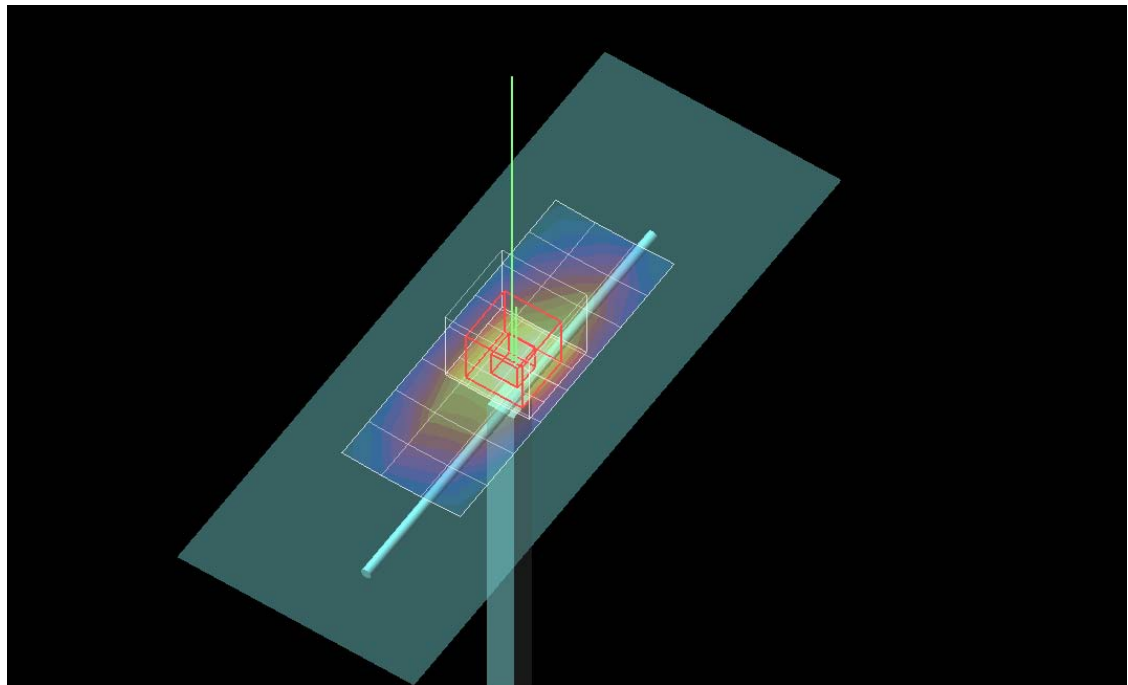
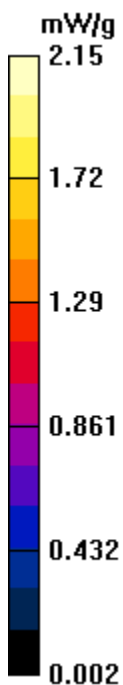
Peak SAR (extrapolated) = 2.92 W/kg

SAR(1 g) = 1.98 mW/g; SAR(10 g) = 1.31 mW/g

Maximum value of SAR (measured) = 2.13 mW/g

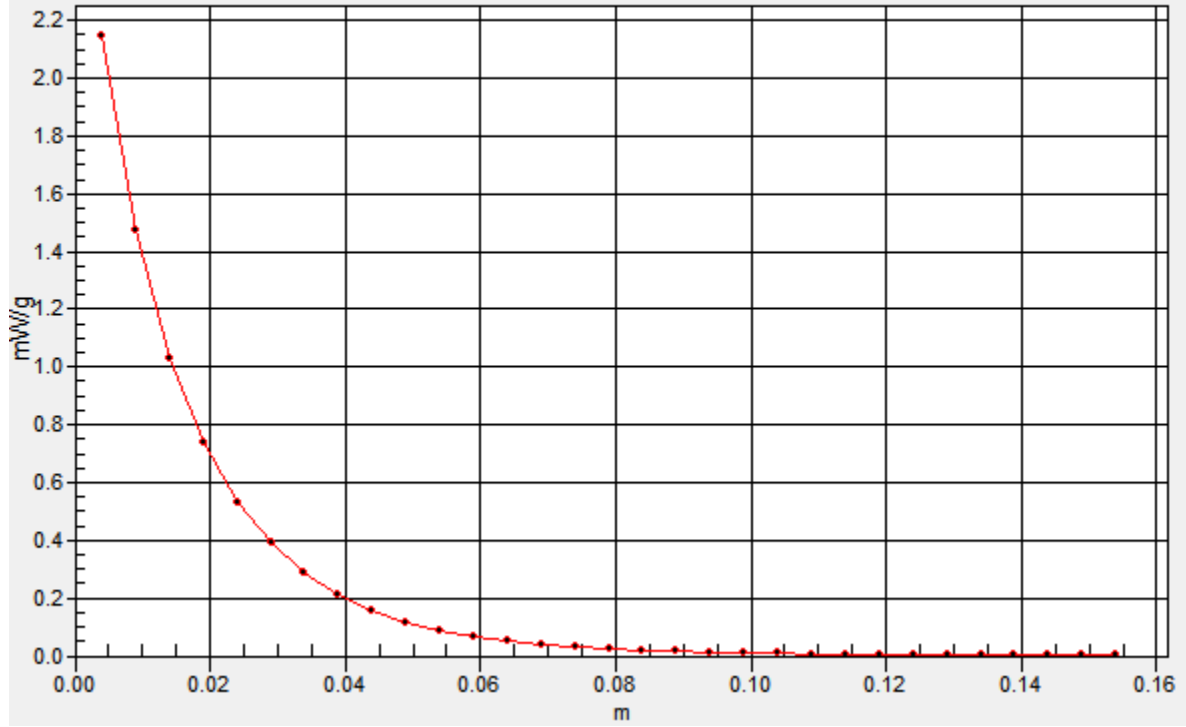
Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 2.15 mW/g



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 835 MHz System Performance Check

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:436

Procedure Notes: PM1 Power =200 mW Refl.Pwr PM3 = -20.67dB [Sim.Temp@SPC](#) = 20.3 Room Temp @ SPC = 21.5

Communication System: CW - Dipole; Frequency: 835 MHz;Duty Cycle: 1:1

Medium: Low Freq Body; Medium parameters used: $f = 835$ MHz; $\sigma = 0.98$ mho/m; $\epsilon_r = 54$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.1, 6.1, 6.1); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.89 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

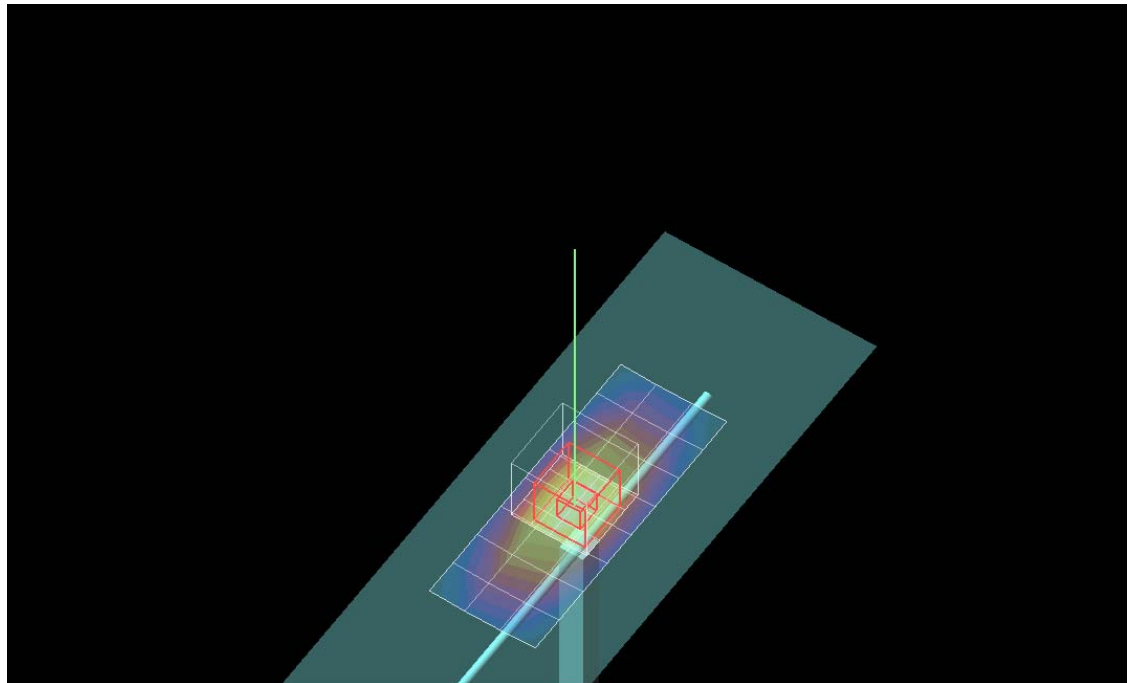
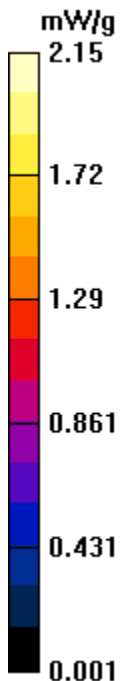
Reference Value = 47.0 V/m; Power Drift = -0.018 dB

Peak SAR (extrapolated) = 2.93 W/kg

SAR(1 g) = 1.99 mW/g; SAR(10 g) = 1.31 mW/g

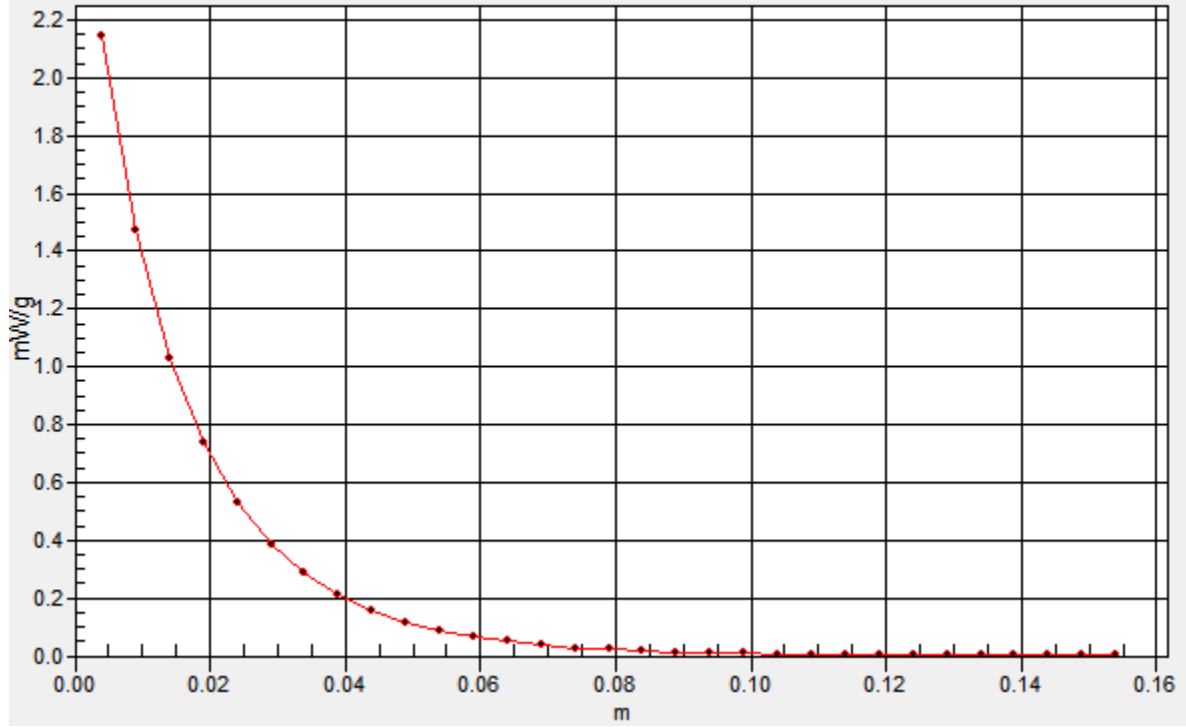
Maximum value of SAR (measured) = 2.15 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:271

Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -20.01 dB [Sim.Temp@SPC](#) = 20.9C Room Temp @ SPC = 21.5C

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue* ; Medium parameters used: $f = 1800$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 51$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.9, 4.9, 4.9); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 8.01 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 75.0 V/m; Power Drift = 0.036 dB

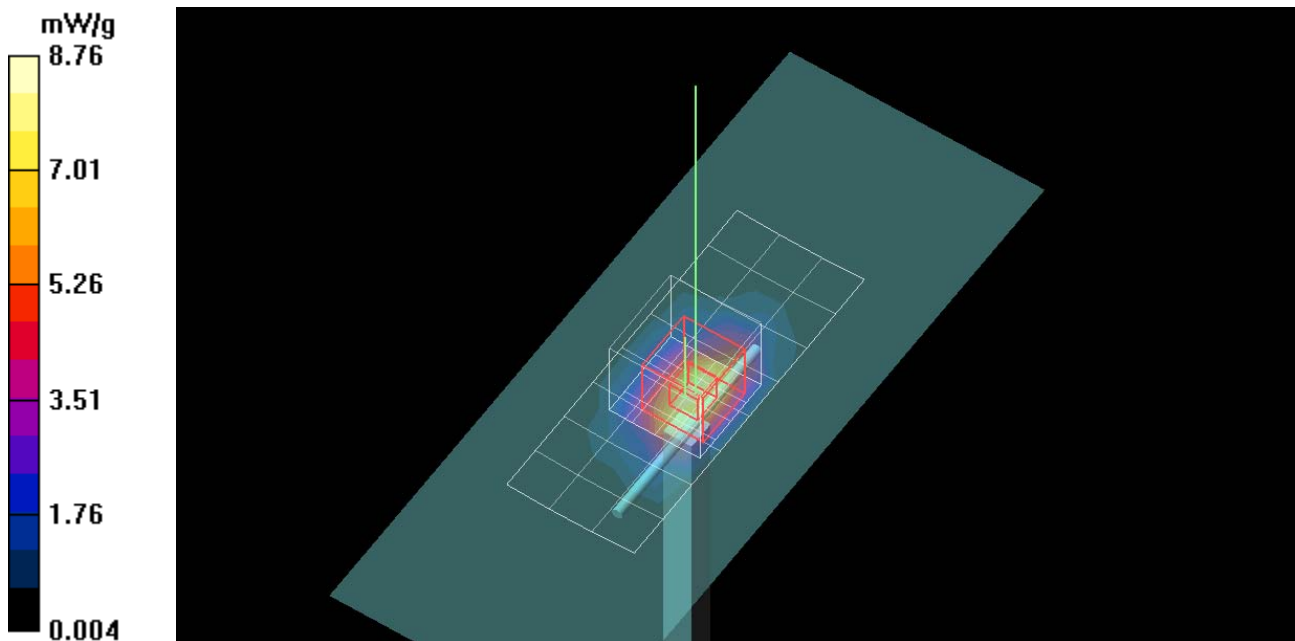
Peak SAR (extrapolated) = 13.5 W/kg

SAR(1 g) = 7.79 mW/g; SAR(10 g) = 4.18 mW/g

Maximum value of SAR (measured) = 8.65 mW/g

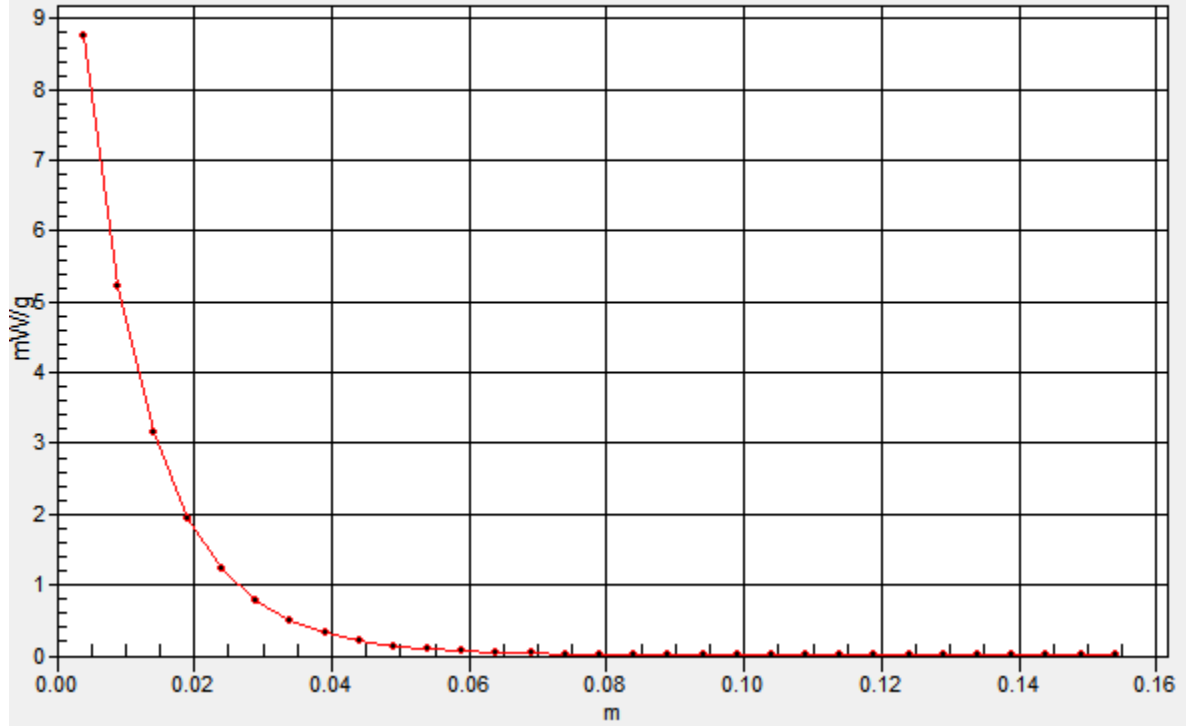
Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 8.76 mW/g



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 1800 MHz System Performance Check

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:271

Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -21.63 dB [Sim.Temp@SPC](#) = 20.3°C Room Temp @ SPC = 21.4°C

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue* ; Medium parameters used: $f = 1800 \text{ MHz}$; $\sigma = 1.46 \text{ mho/m}$; $\epsilon_r = 51.4$; $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.9, 4.9, 4.9); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 6.50 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 79.4 V/m; Power Drift = -0.041 dB

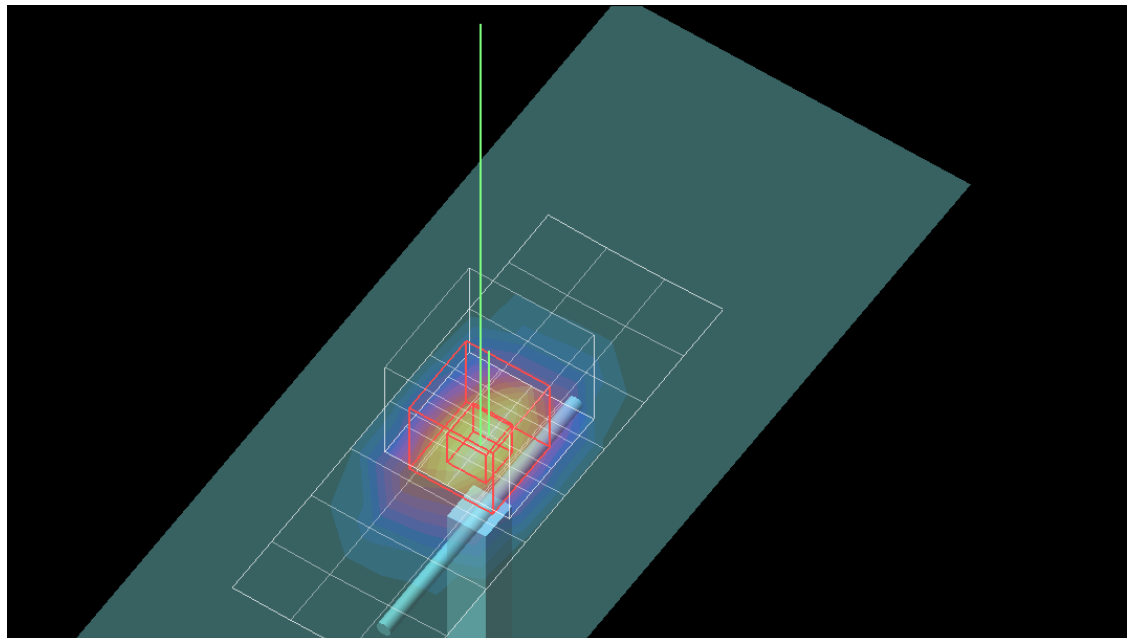
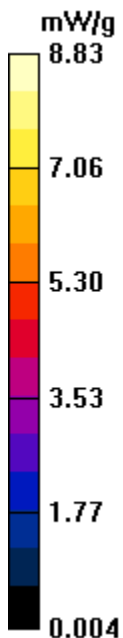
Peak SAR (extrapolated) = 14.0 W/kg

SAR(1 g) = 7.95 mW/g; SAR(10 g) = 4.26 mW/g

Maximum value of SAR (measured) = 8.78 mW/g

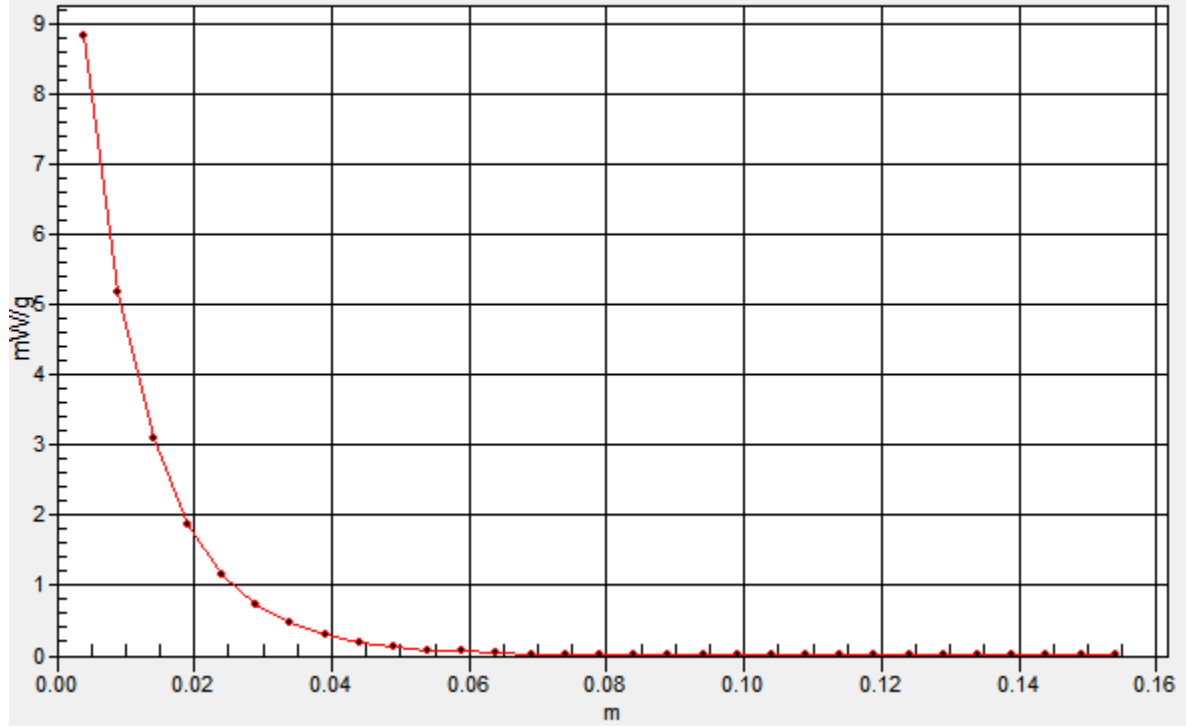
Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of SAR (measured) = 8.83 mW/g



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Test Laboratory: Motorola Mobility 2450 MHz System Performance Check

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:740

Procedure Notes: PM1 Power = 200 mW Refl.Pwr PM3 = -22.65 dB [Sim.Temp@SPC](#) = 20.5°C Room Temp @ SPC = 21.5°C

Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: Validation *BODY Tissue* ; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.95$ mho/m; $\epsilon_r = 50.8$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.33, 4.33, 4.33); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Daily SPC Check/Dipole Area Scan (9x4x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 9.31 mW/g

Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

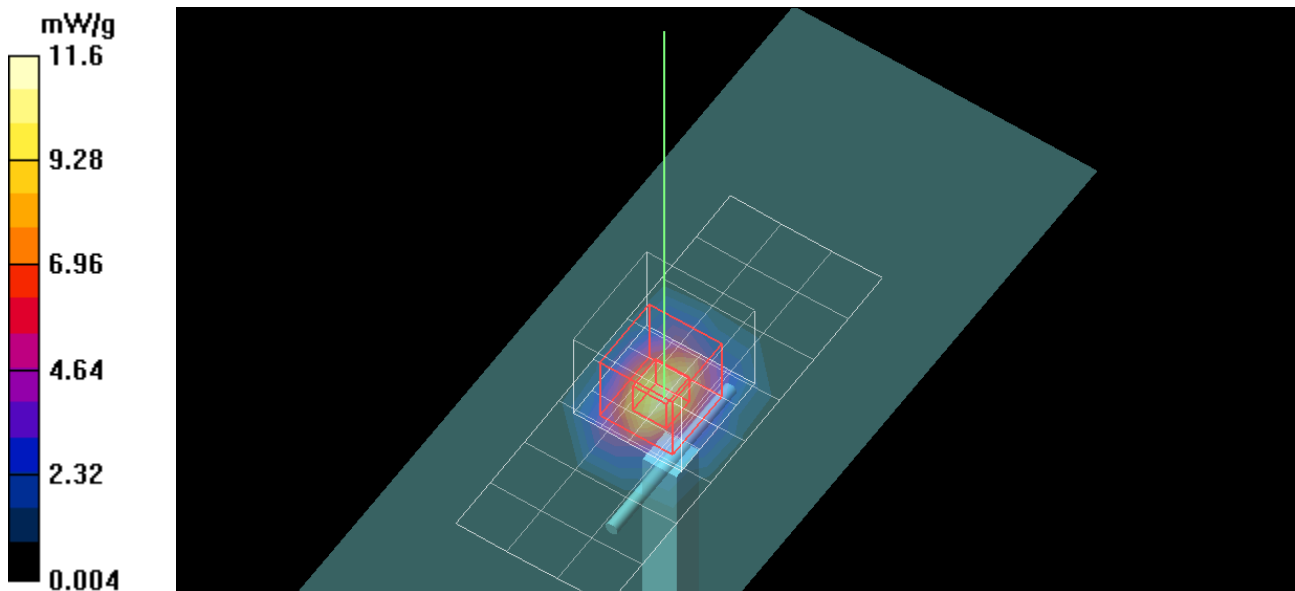
Reference Value = 76.4 V/m; Power Drift = -0.006 dB

Peak SAR (extrapolated) = 20.6 W/kg

SAR(1 g) = 10.3 mW/g; SAR(10 g) = 4.83 mW/g

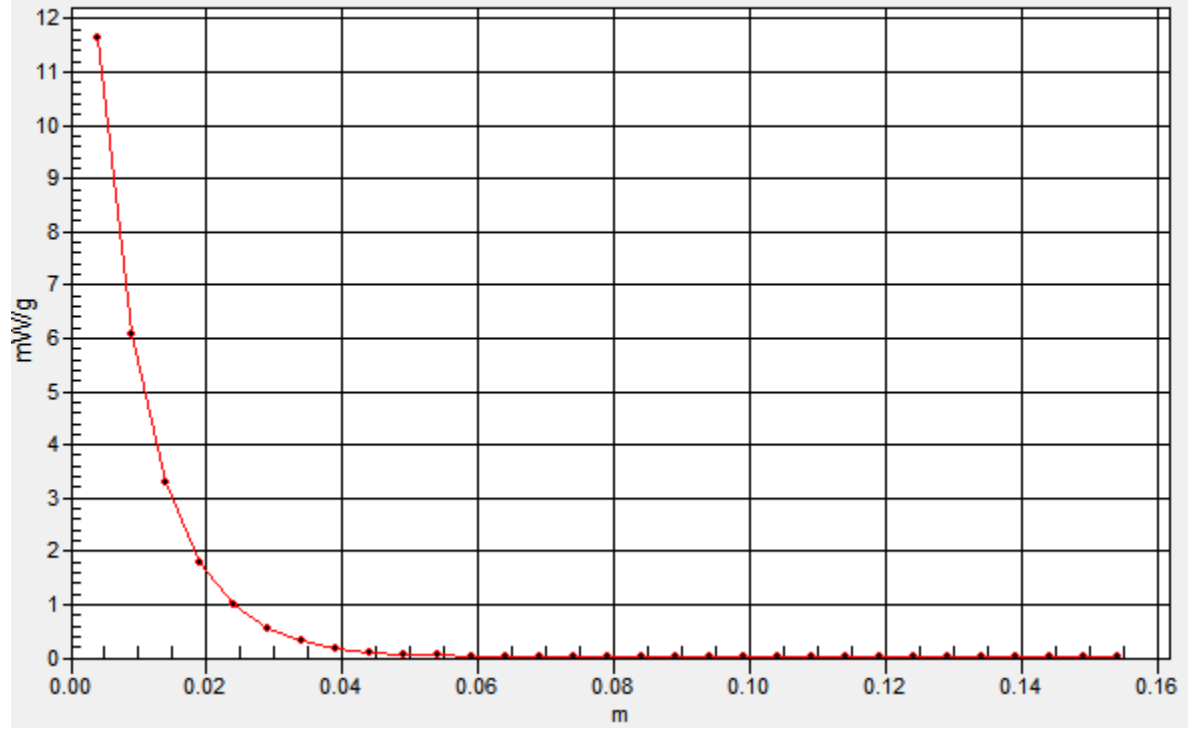
Maximum value of SAR (measured) = 11.6 mW/g

Daily SPC Check/Z-Axis Retraction (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm



SAR(x,y,z,f0)

SAR; Z-Axis Retraction: Value Along Z, X=0, Y=0



Appendix 2

SAR distribution plots for Phantom Head Adjacent Use

Test Laboratory: Motorola Mobility WCDMA 1900 Cheek Touch

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: Pwr Step: All Up Bits Battery Model #: SNN5891A Test Configuration = Cheek Touch

Communication System: 3G/WCDMA 1900; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: Regular Glycol Head 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 38$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(5.11, 5.11, 5.11); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Head Template/Area Scan - Normal Extended (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.540 mW/g

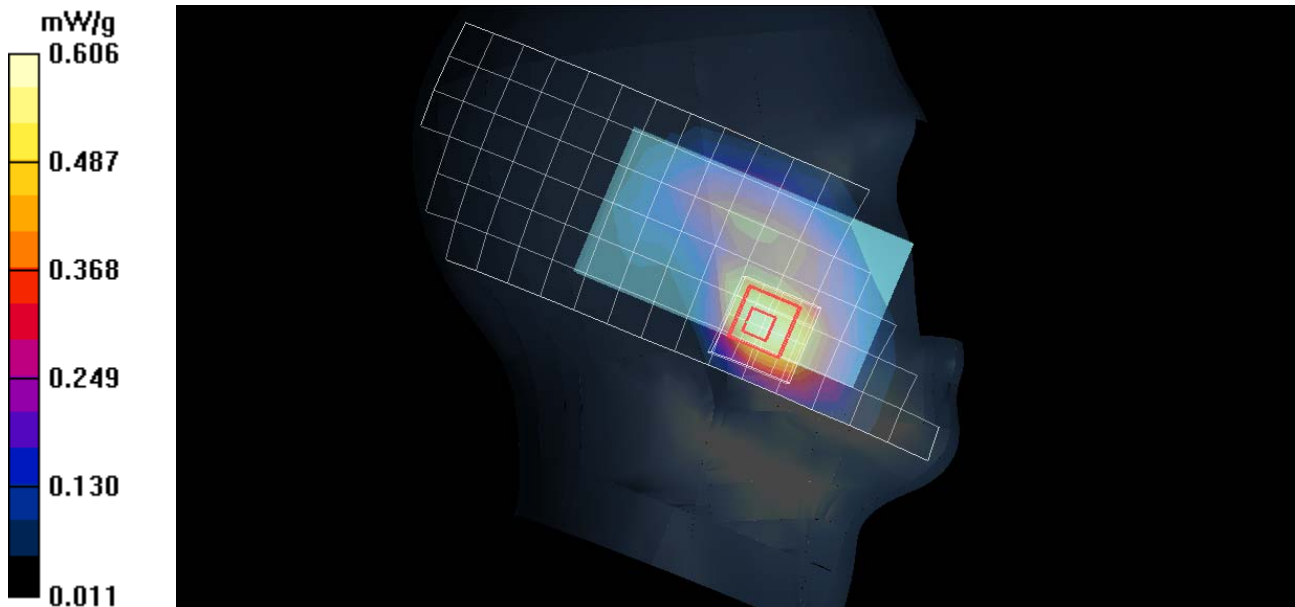
Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 18.7 V/m; Power Drift = -0.100 dB

Peak SAR (extrapolated) = 0.902 W/kg

SAR(1 g) = 0.562 mW/g; SAR(10 g) = 0.343 mW/g

Maximum value of SAR (measured) = 0.606 mW/g



Test Laboratory: Motorola Mobility 2450 MHz WiFi Cheek Touch

DUT: Serial: 356472040000383, fCC ID: IHDP56MA5

Procedure Notes: Pwr Step: Wi-Fi 802.11b 5.5 Mbps Chn 1 Battery Model #: SNN5891A Test Configuration: CHEEK Touch

Communication System: Wi-Fi 2450; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Glycol Head; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.86$ mho/m; $\epsilon_r = 38.1$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.48, 4.48, 4.48); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.127 mW/g

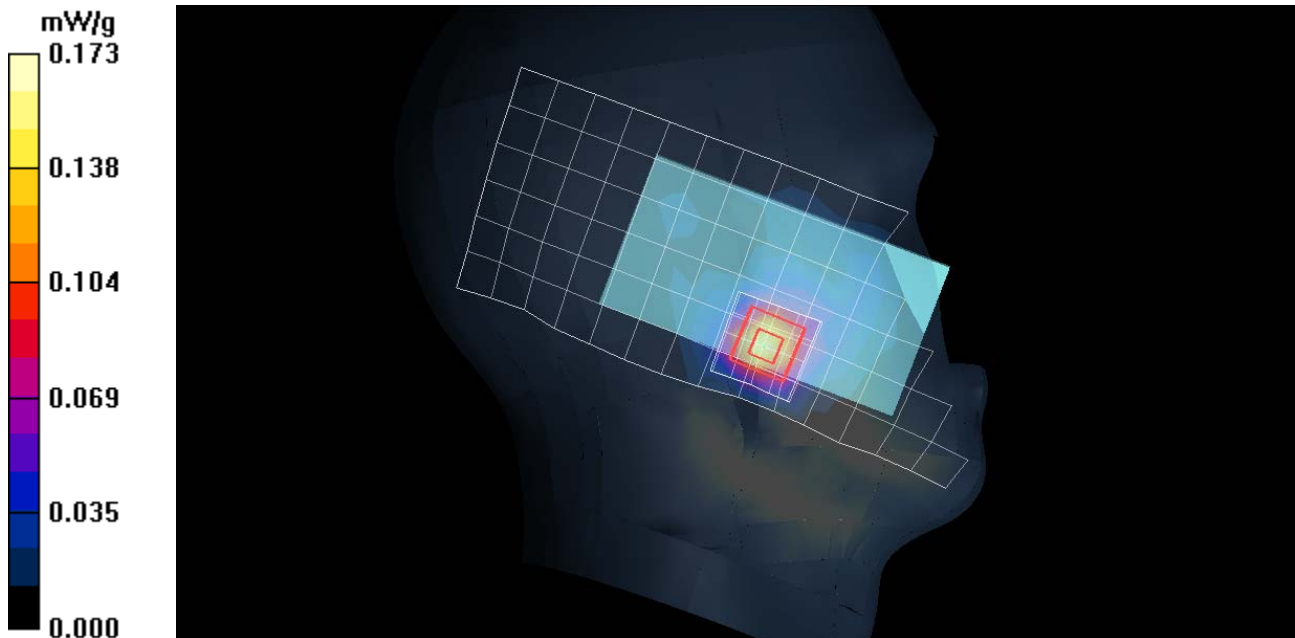
Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.08 V/m; Power Drift = 0.283 dB

Peak SAR (extrapolated) = 0.324 W/kg

SAR(1 g) = 0.153 mW/g; SAR(10 g) = 0.072 mW/g

Maximum value of SAR (measured) = 0.173 mW/g



Test Laboratory: Motorola Mobility GSM 850 Cheek Touch

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: Pwr Step: 5 Battery Model #: SNN5891A Test Configuration: Cheek Touch

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: Low Freq Head; Medium parameters used: $f = 835$ MHz; $\sigma = 0.91$ mho/m; $\epsilon_r = 41.2$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.11, 6.11, 6.11); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1235;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.303 mW/g

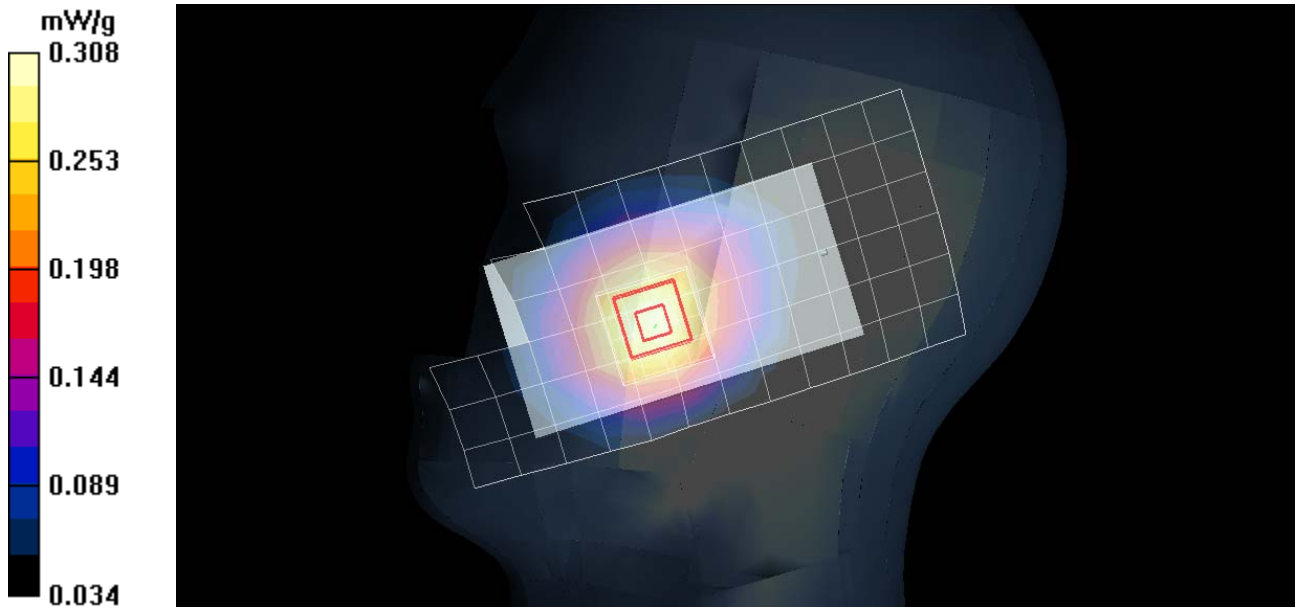
Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 18.3 V/m; Power Drift = -0.012 dB

Peak SAR (extrapolated) = 0.359 W/kg

SAR(1 g) = 0.294 mW/g; SAR(10 g) = 0.222 mW/g

Maximum value of SAR (measured) = 0.308 mW/g



Test Laboratory: Motorola Mobility GPRS 850 Cheek Touch

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: Pwr Step: 05 Battery Model #: SNN5891A Test Configuration: CHEEK Touch

Communication System: GPRS 850 - Class 12; Frequency: 836.6 MHz; Duty Cycle: 1:2.075

Medium: Low Freq Head; Medium parameters used: $f = 835$ MHz; $\sigma = 0.9$ mho/m; $\epsilon_r = 40.2$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.11, 6.11, 6.11); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1235;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.388 mW/g

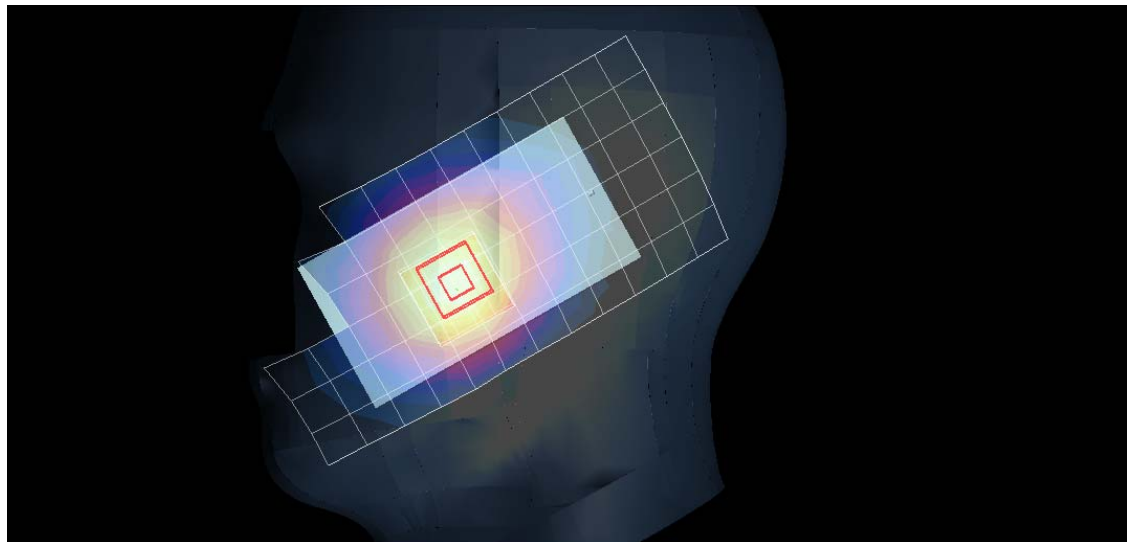
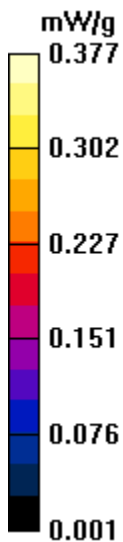
Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.0 V/m; Power Drift = -0.420 dB

Peak SAR (extrapolated) = 0.449 W/kg

SAR(1 g) = 0.363 mW/g; SAR(10 g) = 0.273 mW/g

Maximum value of SAR (measured) = 0.377 mW/g



Test Laboratory: Motorola Mobility WCDMA 850 Cheek Touch

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: Pwr Step: Always Up Battery Model #: SNN5891A Test Configuration: Cheek Touch

Communication System: 3G-WCDMA 850; Frequency: 836 MHz; Duty Cycle: 1:1

Medium: Low Freq Head; Medium parameters used: $f = 835$ MHz; $\sigma = 0.91$ mho/m; $\epsilon_r = 41.2$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.11, 6.11, 6.11); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1235;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm

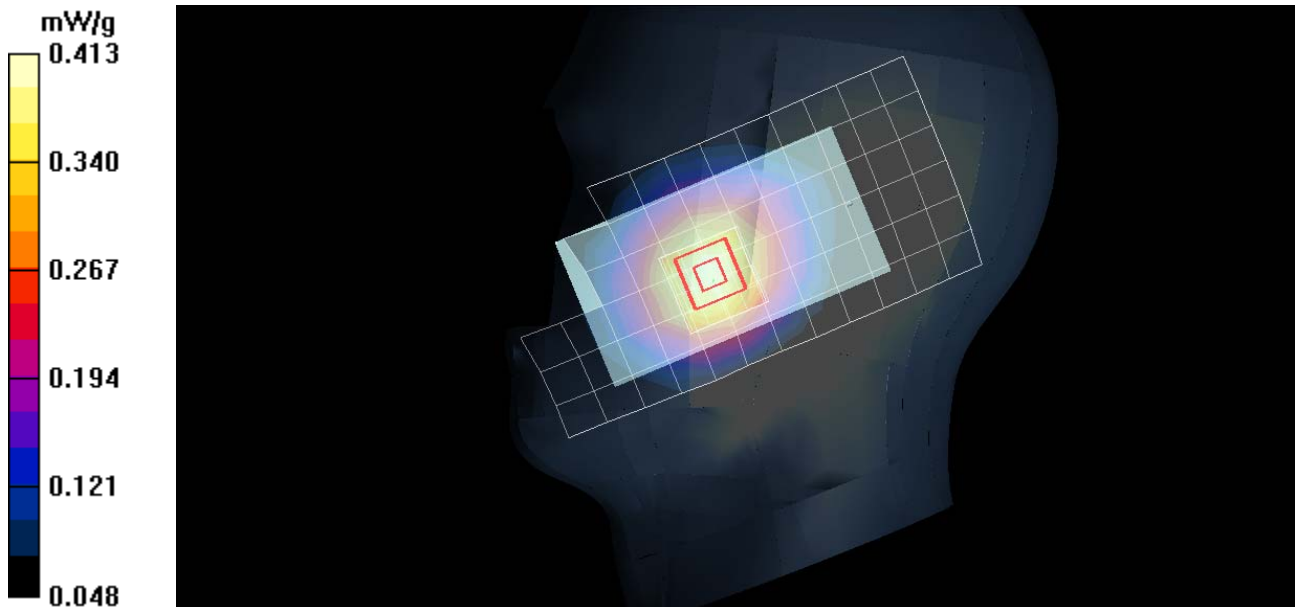
Maximum value of SAR (measured) = 0.413 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.2 V/m; Power Drift = -0.083 dB

Peak SAR (extrapolated) = 0.483 W/kg

SAR(1 g) = 0.395 mW/g; SAR(10 g) = 0.300 mW/g



Test Laboratory: Motorola Mobility GSM 1900 Cheek Touch

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: Pwr Step: 0 Battery Model #: SNN5891A Test Configuration = Cheek Touch

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: Regular Glycol Head 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.46$ mho/m; $\epsilon_r = 38$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(5.11, 5.11, 5.11); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.492 mW/g

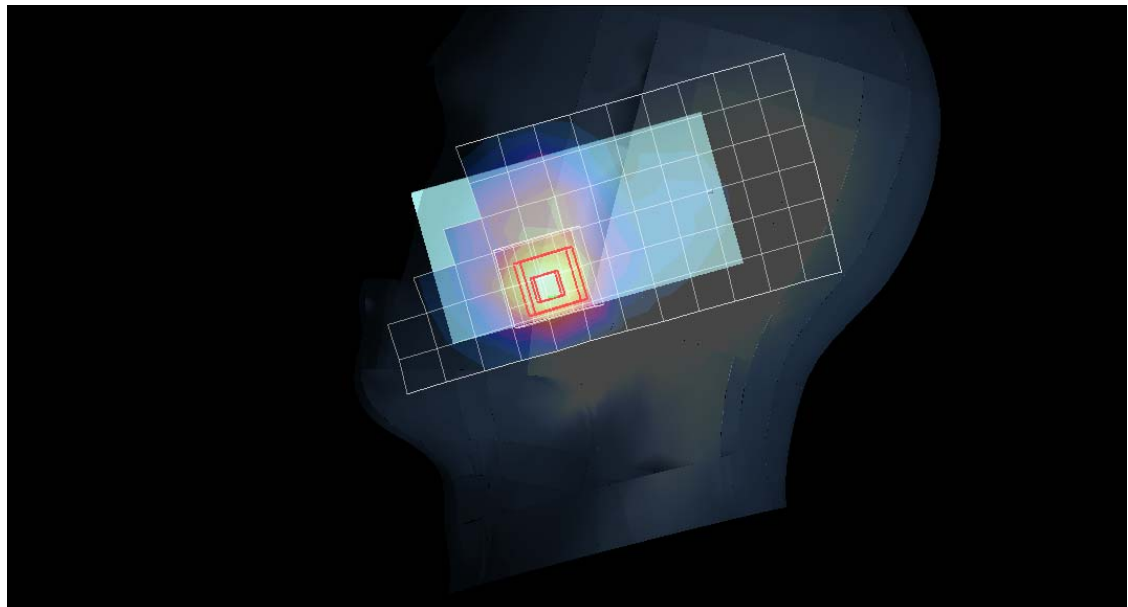
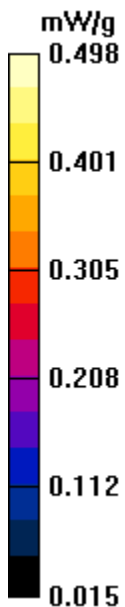
Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 17.5 V/m; Power Drift = -0.076 dB

Peak SAR (extrapolated) = 0.738 W/kg

SAR(1 g) = 0.474 mW/g; SAR(10 g) = 0.288 mW/g

Maximum value of SAR (measured) = 0.498 mW/g



Test Laboratory: Motorola Mobility GPRS 1900 Cheek Touch

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: Pwr Step: 0 Battery Model #: SNN5891A Test Configuration = CHEEK Touch

Communication System: GPRS 1900 - Class 12; Frequency: 1880 MHz; Duty Cycle: 1:2.075

Medium: Regular Glycol Head 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 38$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(5.11, 5.11, 5.11); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.524 mW/g

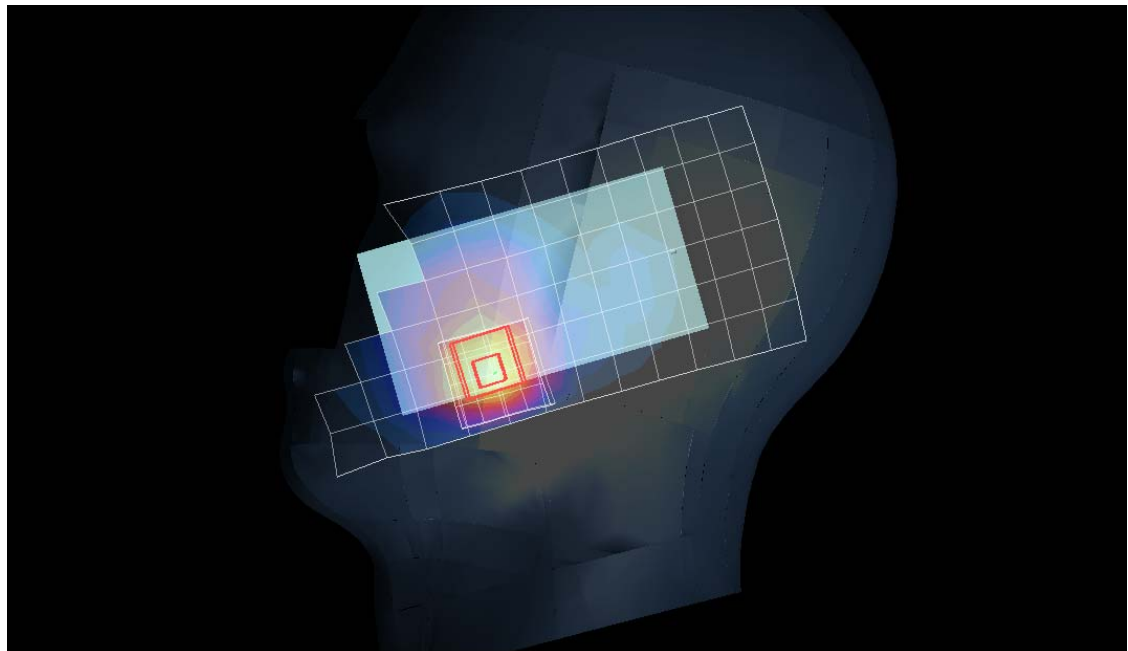
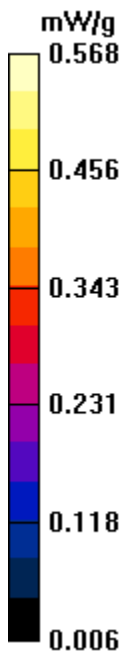
Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 16.4 V/m; Power Drift = -0.255 dB

Peak SAR (extrapolated) = 1.19 W/kg

SAR(1 g) = 0.531 mW/g; SAR(10 g) = 0.314 mW/g

Maximum value of SAR (measured) = 0.568 mW/g



Test Laboratory: Motorola Mobility GSM 1900 15 Degree Tilt

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: Pwr Step: 0 Battery Model #: SNN5891A Test Configuration = 15 degree tilt

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: Regular Glycol Head 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.46$ mho/m; $\epsilon_r = 38$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(5.11, 5.11, 5.11); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.196 mW/g

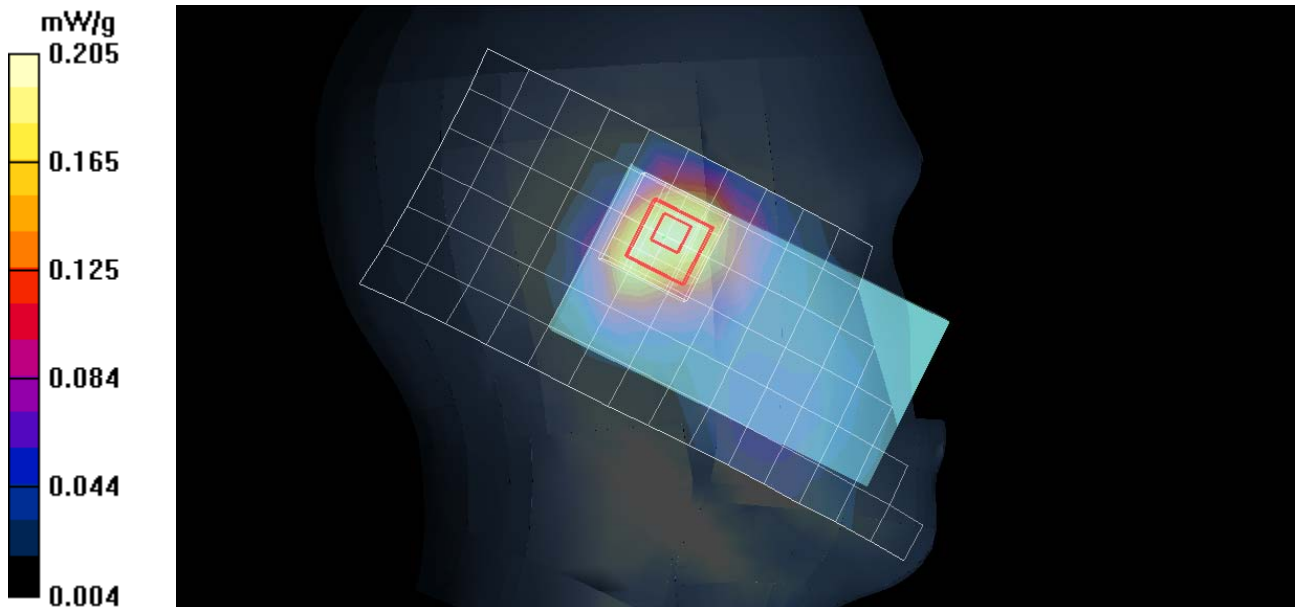
Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.4 V/m; Power Drift = -0.038 dB

Peak SAR (extrapolated) = 0.297 W/kg

SAR(1 g) = 0.194 mW/g; SAR(10 g) = 0.124 mW/g

Maximum value of SAR (measured) = 0.205 mW/g



Test Laboratory: Motorola Mobility WCDMA 1900 15 Degree Tilt

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: Pwr Step: All Up Bits Battery Model #: SNN5891A Test Configuration = 15 Degree Tilt

Communication System: 3G/WCDMA 1900; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: Regular Glycol Head 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 38$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(5.11, 5.11, 5.11); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Head Template/Area Scan - Normal Extended (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.256 mW/g

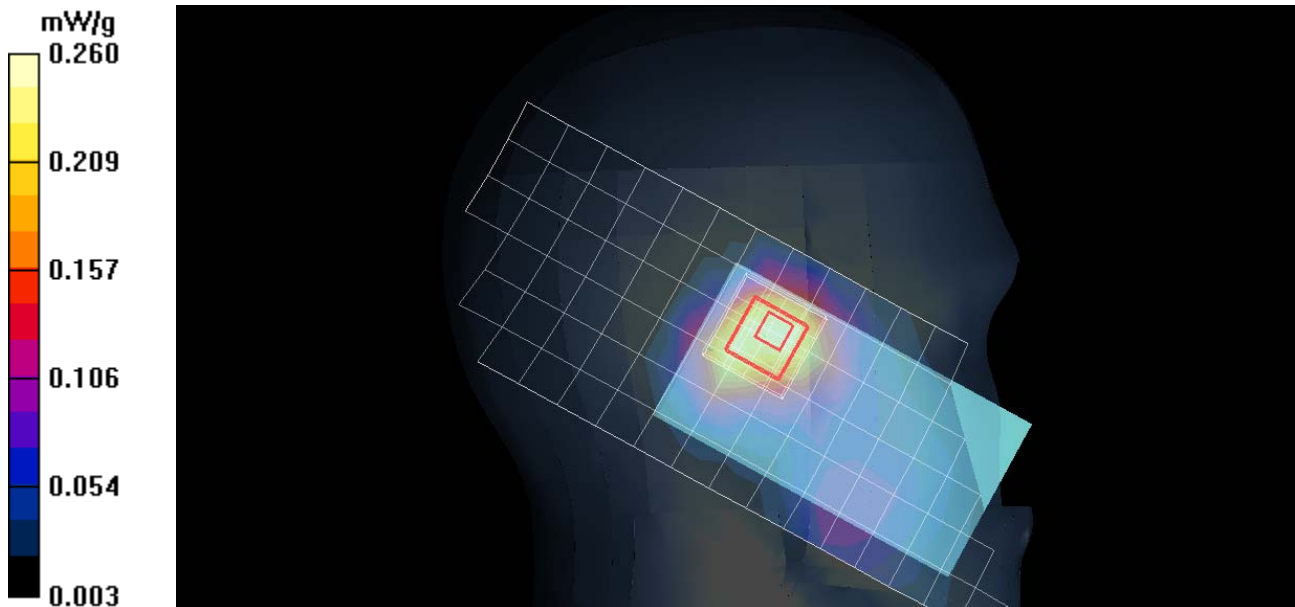
Left Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.2 V/m; Power Drift = 0.003 dB

Peak SAR (extrapolated) = 0.388 W/kg

SAR(1 g) = 0.248 mW/g; SAR(10 g) = 0.156 mW/g

Maximum value of SAR (measured) = 0.260 mW/g



Test Laboratory: Motorola Mobility GSM 850 15 Degree Tilt

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: Pwr Step: 5 Battery Model #: SNN5891A Test Configuration: 15 Degree tilt

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: Low Freq Head; Medium parameters used: $f = 835$ MHz; $\sigma = 0.92$ mho/m; $\epsilon_r = 41.5$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.11, 6.11, 6.11); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1235;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.188 mW/g

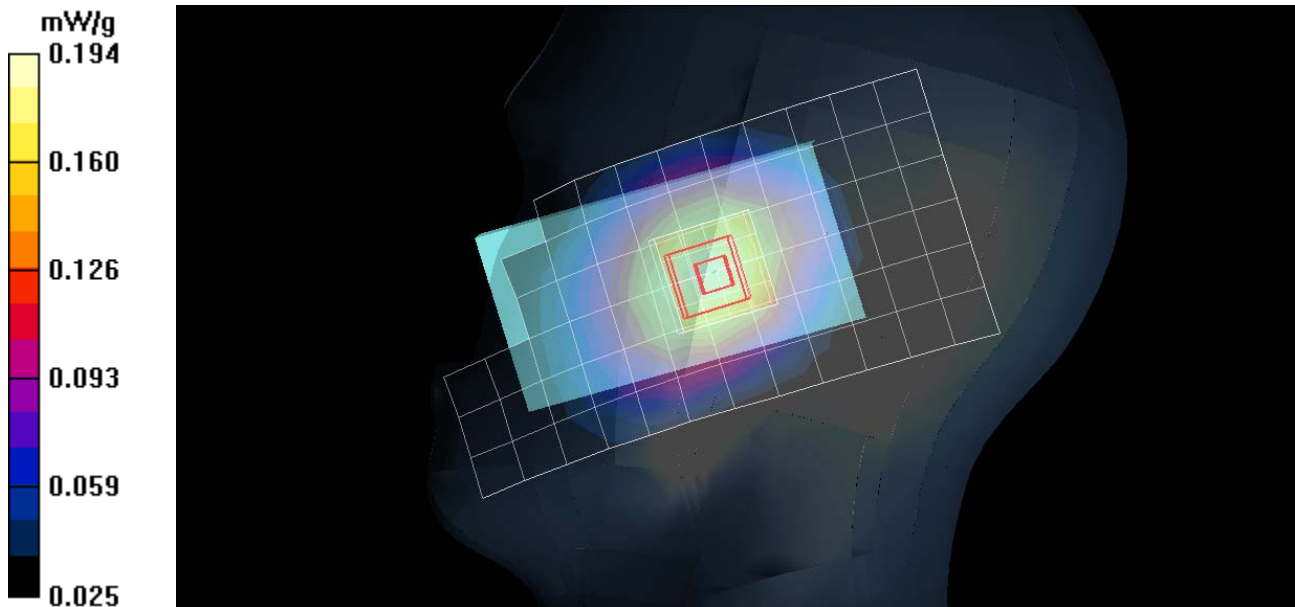
Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.1 V/m; Power Drift = -0.107 dB

Peak SAR (extrapolated) = 0.228 W/kg

SAR(1 g) = 0.184 mW/g; SAR(10 g) = 0.139 mW/g

Maximum value of SAR (measured) = 0.194 mW/g



Test Laboratory: Motorola Mobility WCDMA 850 15 Degree Tilt

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: Pwr Step: Always Up Battery Model #: SNN5891A Test Configuration = 15 Degree Tilt

Communication System: 3G-WCDMA 850; Frequency: 836 MHz; Duty Cycle: 1:1

Medium: Low Freq Head; Medium parameters used: $f = 835$ MHz; $\sigma = 0.91$ mho/m; $\epsilon_r = 41.2$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.11, 6.11, 6.11); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1235;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Head Template/Area Scan - Normal (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.269 mW/g

Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm,

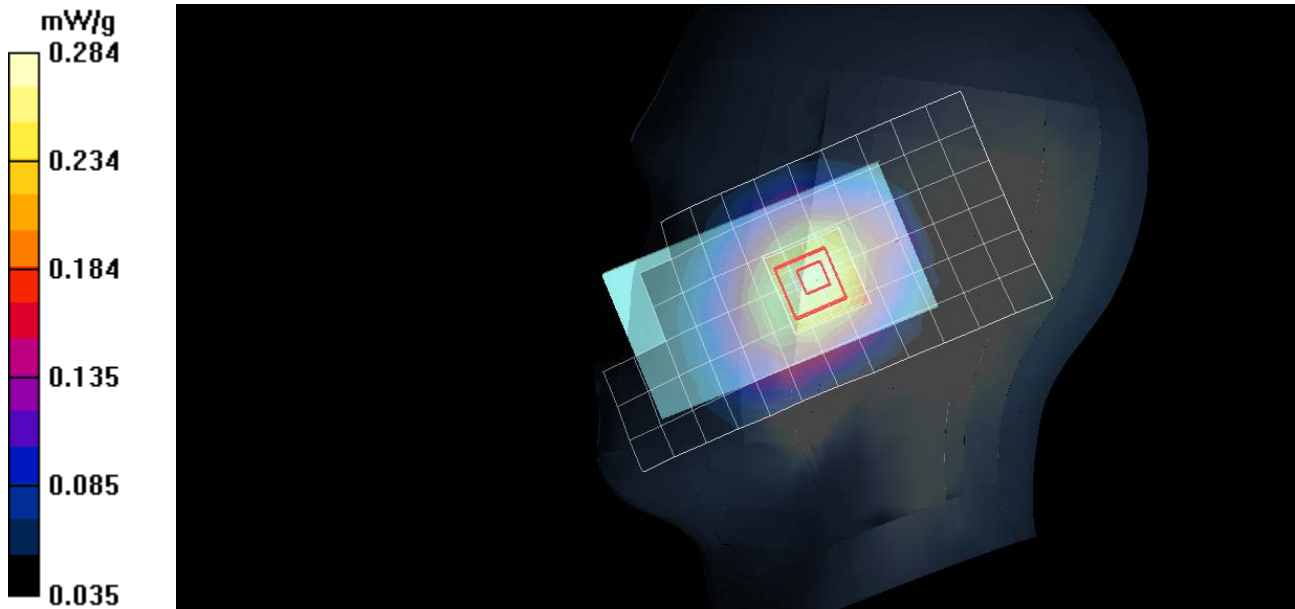
dy=8mm, dz=5mm

Reference Value = 16.7 V/m; Power Drift = 0.047 dB

Peak SAR (extrapolated) = 0.335 W/kg

SAR(1 g) = 0.269 mW/g; SAR(10 g) = 0.203 mW/g

Maximum value of SAR (measured) = 0.284 mW/g



Test Laboratory: Motorola Mobility 2450 MHz WiFi 15 Degree Tilt

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: 802.11b 1 Mbps Chn 6 Battery Model #: SNN5891A Test Configuration: 15 Degree Rotated Communication System: Wi-Fi 2450; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Glycol Head; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.85$ mho/m; $\epsilon_r = 38.1$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.48, 4.48, 4.48); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1136;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Head Template/Area Scan - Normal Extended (15mm) (7x17x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.026 mW/g

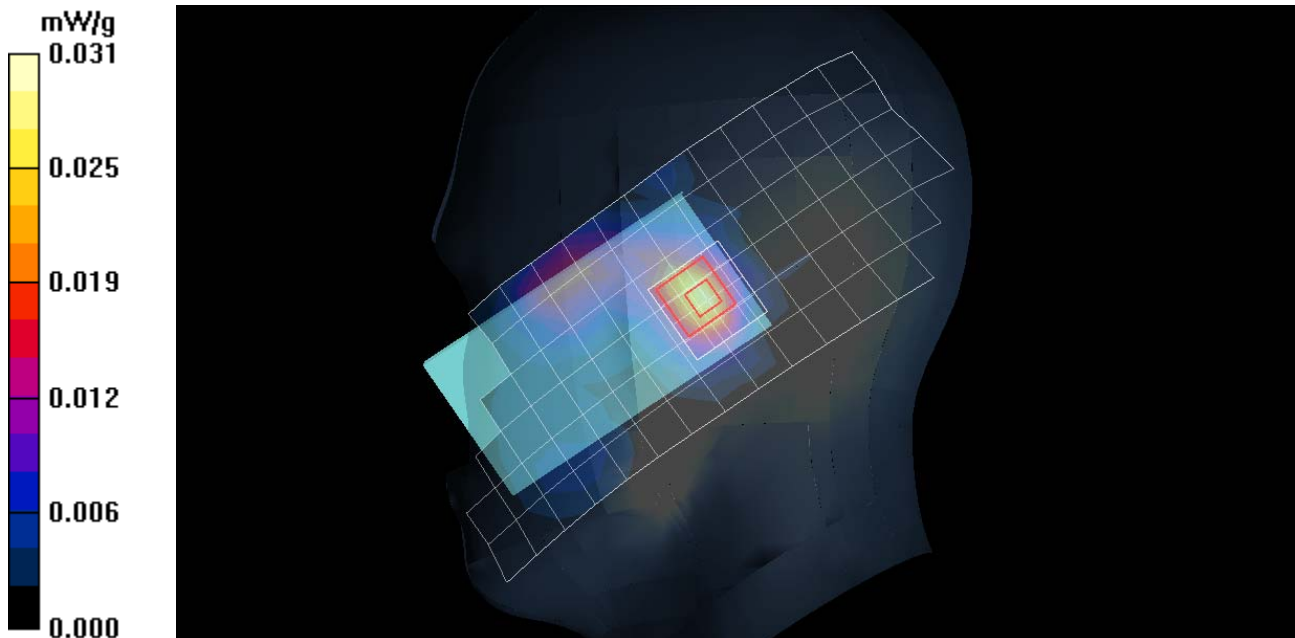
Right Head Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.92 V/m; Power Drift = 0.103 dB

Peak SAR (extrapolated) = 0.048 W/kg

SAR(1 g) = 0.026 mW/g; SAR(10 g) = 0.013 mW/g

Maximum value of SAR (measured) = 0.031 mW/g



Appendix 3

SAR distribution plots for Body Worn Configuration

Test Laboratory: Motorola Mobility GPRS 850 Body Worn

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: Pwr Step: 5 Battery Model #: SNN5891A Test Configuration = Back of Phone 25mm from Phantom
Communication System: GPRS 850 - Class 12; Frequency: 836.6 MHz; Duty Cycle: 1:2.075

Medium: Low Freq Body; Medium parameters used: $f = 835$ MHz; $\sigma = 0.98$ mho/m; $\epsilon_r = 55$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.1, 6.1, 6.1); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Normal Extended Body (15mm) (16x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.358 mW/g

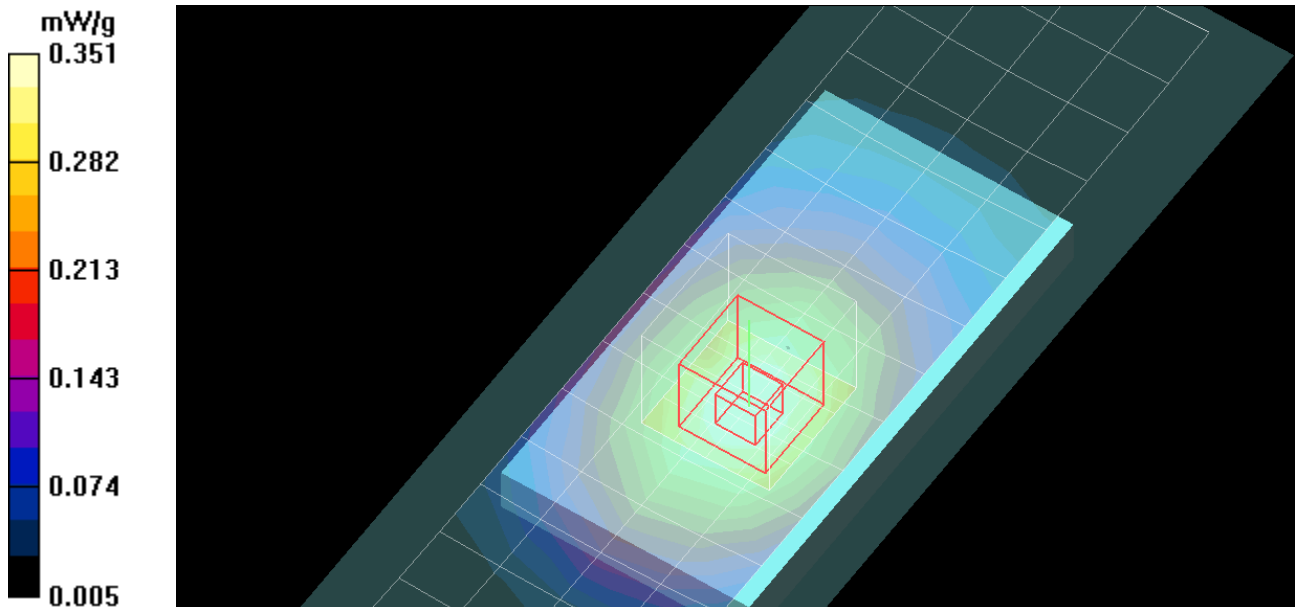
Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.6 V/m; Power Drift = -0.319 dB

Peak SAR (extrapolated) = 0.432 W/kg

SAR(1 g) = 0.335 mW/g; SAR(10 g) = 0.250 mW/g

Maximum value of SAR (measured) = 0.351 mW/g



Test Laboratory: Motorola Mobility WCDMA 850 Body Worn

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: Pwr Step: Always Up Battery Model #: SNN5891A Test Configuration = Back of Phone 25mm from Phantom

Communication System: 3G-WCDMA 850; Frequency: 836 MHz; Duty Cycle: 1:1

Medium: Low Freq Body; Medium parameters used: $f = 835$ MHz; $\sigma = 0.98$ mho/m; $\epsilon_r = 55$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.1, 6.1, 6.1); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Normal Extended Body (15mm) (16x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.272 mW/g

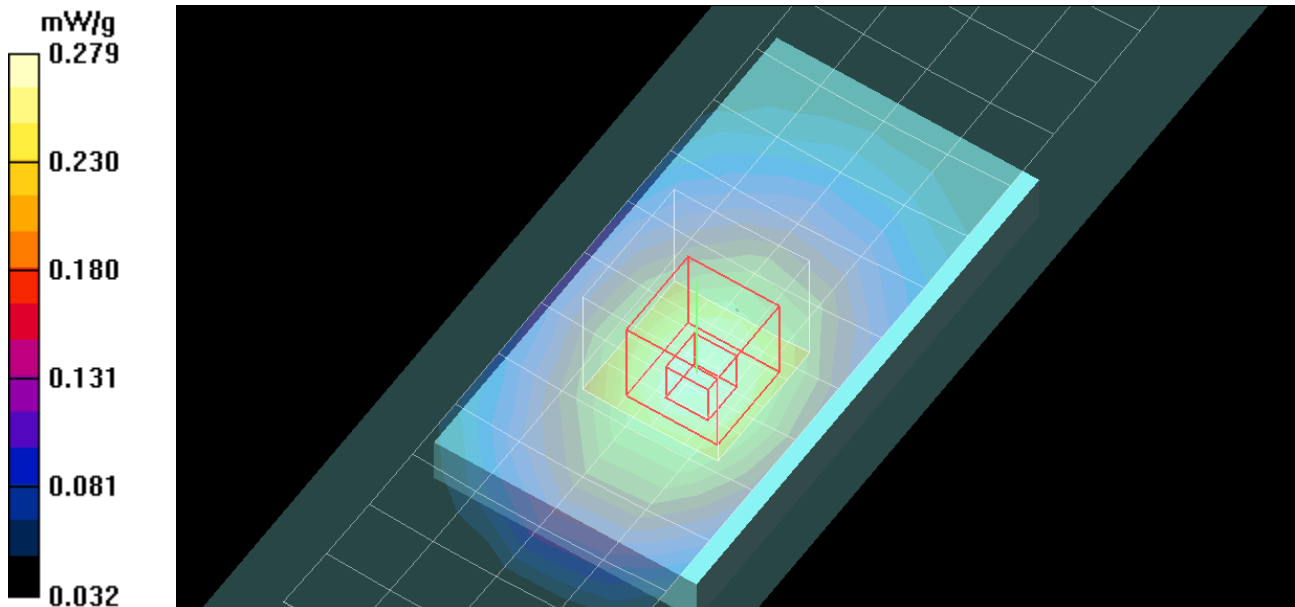
Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 16.8 V/m; Power Drift = -0.061 dB

Peak SAR (extrapolated) = 0.348 W/kg

SAR(1 g) = 0.265 mW/g; SAR(10 g) = 0.195 mW/g

Maximum value of SAR (measured) = 0.279 mW/g



Test Laboratory: Motorola Mobility GPRS 1900 Body Worn

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: Pwr Step: 0 Battery Model #: SNN5891A Test Configuration = Back of Phone 25mm Phantom

Communication System: GPRS 1900 - Class 12; Frequency: 1880 MHz; Duty Cycle: 1:2.075

Medium: Regular Glycol Body 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.57$ mho/m; $\epsilon_r = 50.8$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.9, 4.9, 4.9); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Full Body (15mm) (18x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.141 mW/g

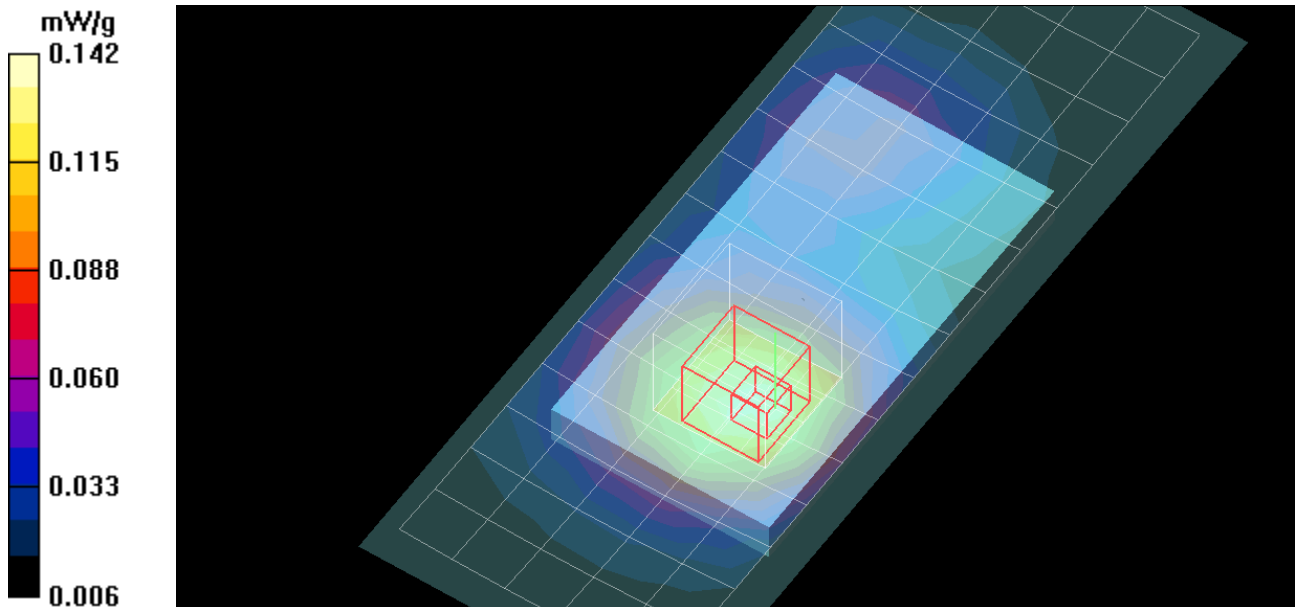
Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.12 V/m; Power Drift = -0.367 dB

Peak SAR (extrapolated) = 0.201 W/kg

SAR(1 g) = 0.131 mW/g; SAR(10 g) = 0.085 mW/g

Maximum value of SAR (measured) = 0.142 mW/g



Test Laboratory: Motorola Mobility WCDMA 1900 Body Worn

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: Pwr Step: All Up Bits Battery Model #: SNN5891A Test Configuration = Back of Phone 25mm from Phantom

Communication System: 3G/WCDMA 1900; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.57$ mho/m; $\epsilon_r = 50.8$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.9, 4.9, 4.9); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Full Body (15mm) (18x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.173 mW/g

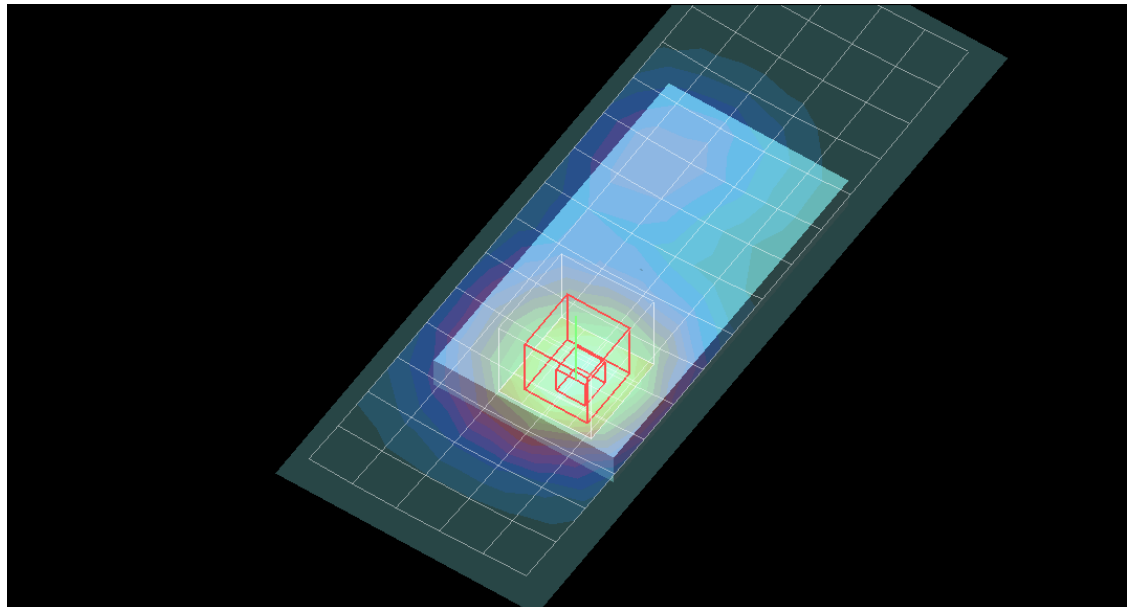
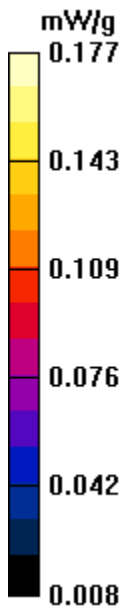
Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.3 V/m; Power Drift = 0.032 dB

Peak SAR (extrapolated) = 0.251 W/kg

SAR(1 g) = 0.166 mW/g; SAR(10 g) = 0.108 mW/g

Maximum value of SAR (measured) = 0.177 mW/g



Test Laboratory: Motorola Mobility 2450 MHz WiFi Body Worn

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: 802.11b 1 Mbps Chn 1 Battery Model #: SNN5891A Test Configuration = BACK OF PHONE
25MM FROM PHANTOM

Communication System: Wi-Fi 2450; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Glycol Body; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.95$ mho/m; $\epsilon_r = 50.8$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.33, 4.33, 4.33); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Normal Extended Body (10mm) (24x10x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.038 mW/g

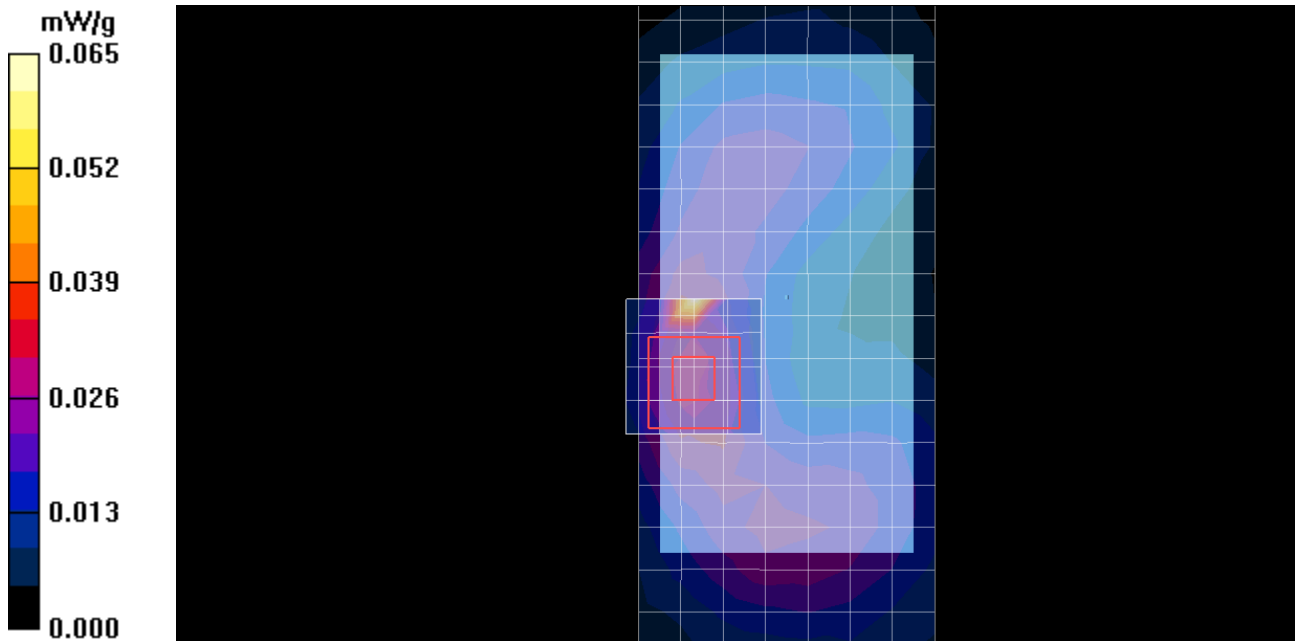
Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.14 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 0.065 W/kg

SAR(1 g) = 0.037 mW/g; SAR(10 g) = 0.022 mW/g

Maximum value of SAR (measured) = 0.065 mW/g



Appendix 4

SAR distribution plots for Mobile Hotspot Configuration

Test Laboratory: Motorola Mobility GPRS 850 Mobile Hotspot

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: Pwr Step: 05 Battery Model #: SNN5891A Test Configuration = BACK OF PHONE 10MM FROM PHANTOM

Communication System: GPRS 850 - Class 12; Frequency: 836.6 MHz; Duty Cycle: 1:2.075

Medium: Low Freq Body; Medium parameters used: $f = 835$ MHz; $\sigma = 0.97$ mho/m; $\epsilon_r = 54.1$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.1, 6.1, 6.1); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Normal Extended Body (15mm) (16x7x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.750 mW/g

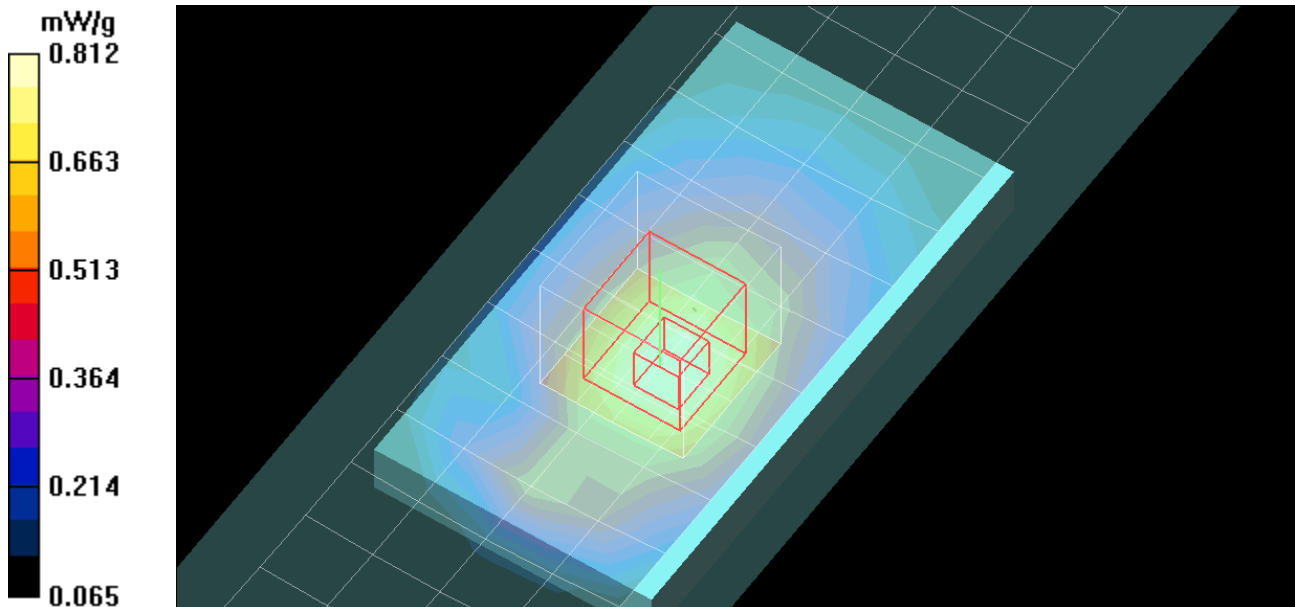
Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 28.3 V/m; Power Drift = 0.021 dB

Peak SAR (extrapolated) = 0.991 W/kg

SAR(1 g) = 0.768 mW/g; SAR(10 g) = 0.545 mW/g

Maximum value of SAR (measured) = 0.812 mW/g



Test Laboratory: Motorola Mobility WCDMA 850 Mobile Hotspot

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: Pwr Step:ALWAYS UP Battery Model #: SNN5891A Test Configuration = BACK OF PHONE
10MM FROM PHANTOM

Communication System: 3G-WCDMA 850; Frequency: 836 MHz;Duty Cycle: 1:1

Medium: Low Freq Body; Medium parameters used: $f = 835$ MHz; $\sigma = 0.98$ mho/m; $\epsilon_r = 54$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(6.1, 6.1, 6.1); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Normal Body (10mm) (19x10x1): Measurement grid:

$dx=10$ mm, $dy=10$ mm

Maximum value of SAR (measured) = 1.05 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm,

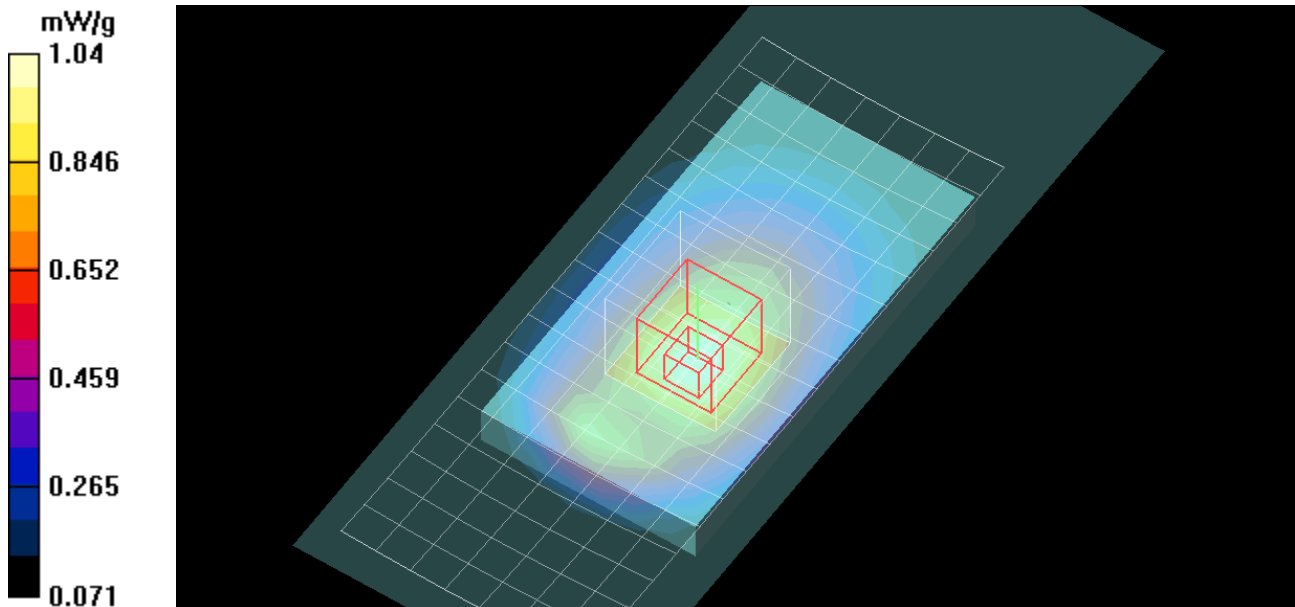
$dy=8$ mm, $dz=5$ mm

Reference Value = 31.8 V/m; Power Drift = 0.012 dB

Peak SAR (extrapolated) = 1.31 W/kg

SAR(1 g) = 0.983 mW/g; SAR(10 g) = 0.708 mW/g

Maximum value of SAR (measured) = 1.04 mW/g



Test Laboratory: Motorola Mobility WCDMA 1900 Mobile Hotspot

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: Pwr Step: ALL UP BITS Battery Model #: SNN5891A Test Configuration = BACK OF PHONE 10MM FROM PHANTOM

Communication System: 3G/WCDMA 1900; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: Regular Glycol Body 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.56$ mho/m; $\epsilon_r = 51.2$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.9, 4.9, 4.9); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Normal Extended Body (15mm) (16x7x1): Measurement grid:

$dx=15$ mm, $dy=15$ mm

Maximum value of SAR (measured) = 0.885 mW/g

Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm,

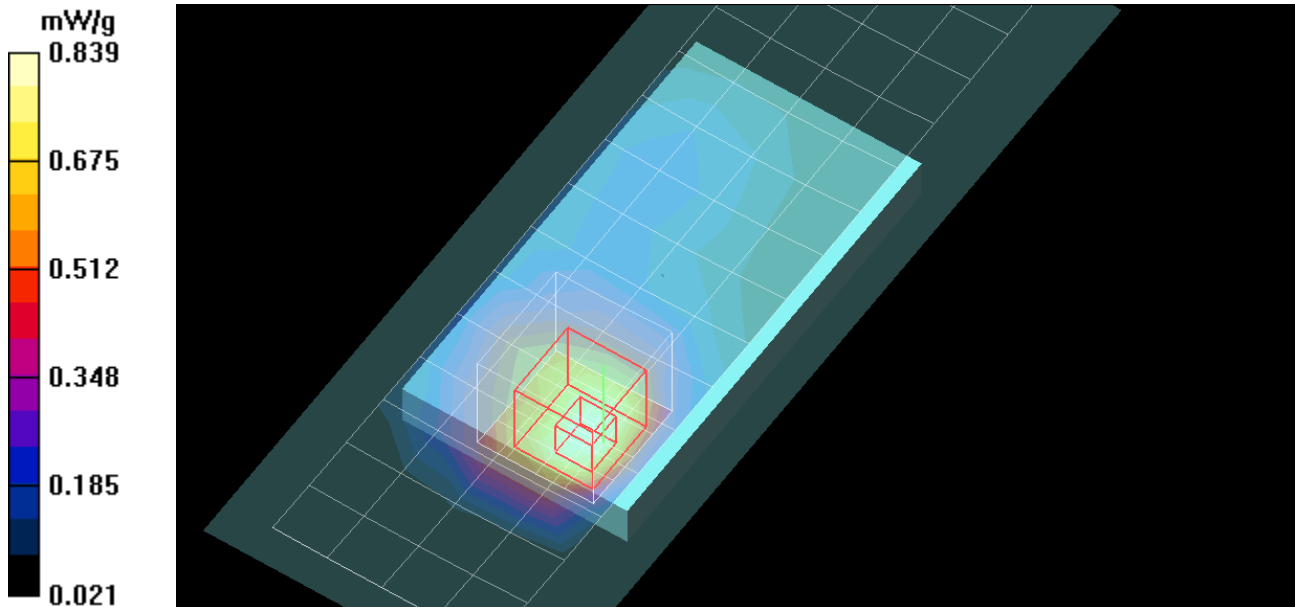
$dy=8$ mm, $dz=5$ mm

Reference Value = 20.1 V/m; Power Drift = 0.033 dB

Peak SAR (extrapolated) = 1.39 W/kg

SAR(1 g) = 0.805 mW/g; SAR(10 g) = 0.471 mW/g

Maximum value of SAR (measured) = 0.839 mW/g



Test Laboratory: Motorola Mobility 2450 MHz WiFi Mobile Hotspot

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: 802.11b 1Mbps Chn 1 Battery Model #: SNN5891A Test Configuration = BACK OF PHONE
10MM FROM PHANTOM

Communication System: Wi-Fi 2450; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Glycol Body; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.95$ mho/m; $\epsilon_r = 50.8$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.33, 4.33, 4.33); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Normal Extended Body (10mm) (24x10x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.255 mW/g

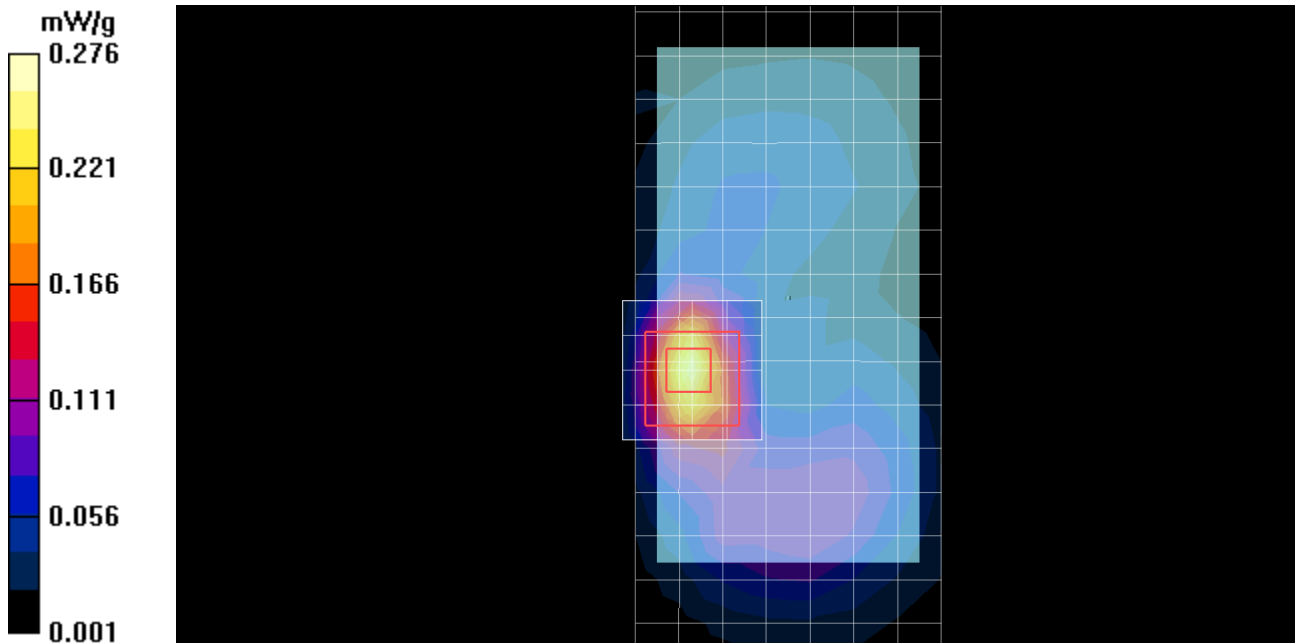
Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.02 V/m; Power Drift = 0.010 dB

Peak SAR (extrapolated) = 0.501 W/kg

SAR(1 g) = 0.238 mW/g; SAR(10 g) = 0.111 mW/g

Maximum value of SAR (measured) = 0.276 mW/g



Test Laboratory: Motorola Mobility GPRS 1900 Mobile Hotspot

DUT: Serial: 356472040000383, FCC ID: IHDP56MA5

Procedure Notes: Pwr Step: 0 Battery Model #: SNN5891A Test Configuration = Bottom Edge of Phone 10mm from Phantom

Communication System: GPRS 1900 - Class 12; Frequency: 1880 MHz; Duty Cycle: 1:2.075

Medium: Regular Glycol Body 1750/1880; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.57$ mho/m; $\epsilon_r = 50.8$; $\rho = 1000$ kg/m³

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.9, 4.9, 4.9); Calibrated: 3/11/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn702; Calibrated: 4/14/2011
- Phantom: R#2_ Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Amy Twin Phone Template/Area Scan - Full Body (15mm) (18x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.466 mW/g

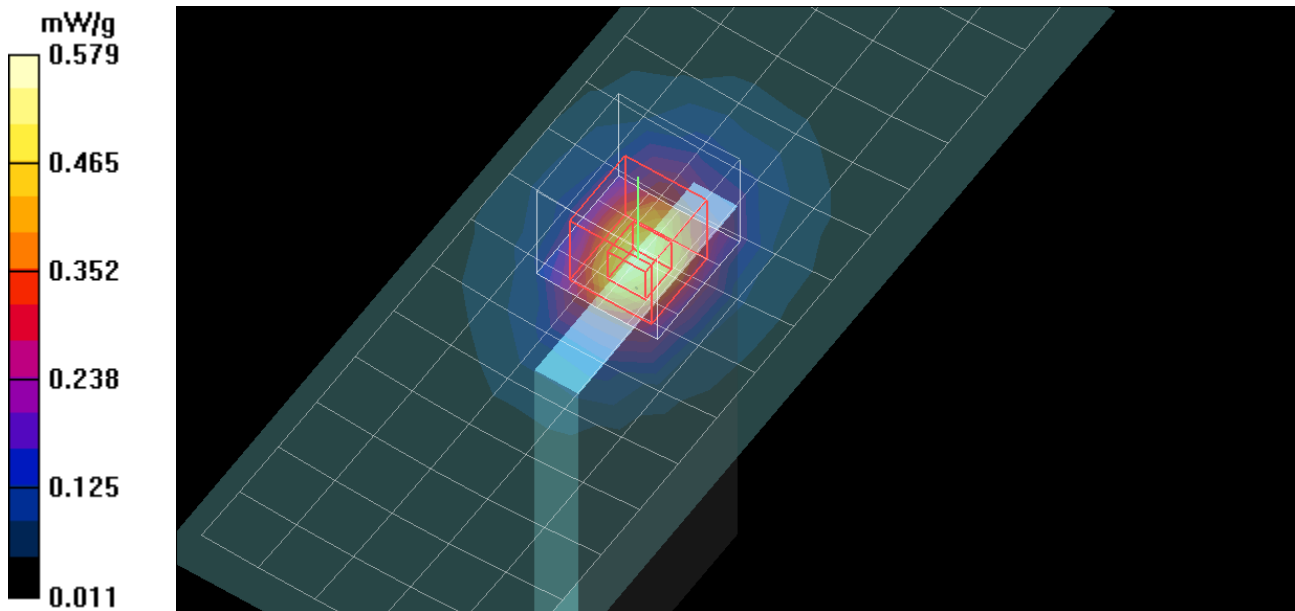
Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 18.6 V/m; Power Drift = -0.058 dB

Peak SAR (extrapolated) = 0.857 W/kg

SAR(1 g) = 0.507 mW/g; SAR(10 g) = 0.276 mW/g

Maximum value of SAR (measured) = 0.579 mW/g



Appendix 5

Measurement Uncertainty Budget

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	$e = f(d,k)$	<i>f</i>	<i>g</i>	$h = c \times f / e$	$i = c \times g / e$	<i>k</i>
Uncertainty Component	IEEE 1528 section	Tol. (± %)	Prob Dist	Div.	c_i (1 g)	c_i (10 g)	1 g u_i (±%)	10 g u_i (±%)	v_i
Measurement System									
Probe Calibration	E.2.1	5.9	N	1.00	1	1	5.9	5.9	∞
Axial Isotropy	E.2.2	4.7	R	1.73	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	1.73	0.707	0.707	3.9	3.9	∞
Boundary Effect	E.2.3	1.0	R	1.73	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	1.73	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	1.73	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	N	1.00	1	1	0.3	0.3	∞
Response Time	E.2.7	1.1	R	1.73	1	1	0.6	0.6	∞
Integration Time	E.2.8	1.1	R	1.73	1	1	0.6	0.6	∞
RF Ambient Conditions - Noise	E.6.1	3.0	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	0.0	R	1.73	1	1	0.0	0.0	∞
Probe Positioner Mech. Tolerance	E.6.2	0.4	R	1.73	1	1	0.2	0.2	∞
Probe Positioning w.r.t Phantom	E.6.3	1.4	R	1.73	1	1	0.8	0.8	∞
Max. SAR Evaluation (ext., int., avg.)	E.5	3.4	R	1.73	1	1	2.0	2.0	∞
Test sample Related									
Test Sample Positioning	E.4.2	3.2	N	1.00	1	1	3.2	3.2	29
Device Holder Uncertainty	E.4.1	4.0	N	1.00	1	1	4.0	4.0	8
SAR drift	6.6.2	5.0	R	1.73	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4.0	R	1.73	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	E.3.3	3.3	N	1.00	0.64	0.43	2.1	1.4	∞
Liquid Permittivity (target)	E.3.2	5.0	R	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	E.3.3	1.9	N	1.00	0.6	0.49	1.1	0.9	∞
Combined Standard Uncertainty			RSS				11.1	10.8	411
Expanded Uncertainty (95% CONFIDENCE LEVEL)			$k=2$				22.2	21.6	

Appendix 6

Probe Calibration Certificate



Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Motorola MDB**

Certificate No: **ES3-3184_Mar11**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3184**

Calibration procedure(s) **QA CAL-01.v7, QA CAL-23.v4, QA CAL-25.v3
Calibration procedure for dosimetric E-field probes**

Calibration date: **March 11, 2011**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	01-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	01-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	01-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	23-Apr-10 (No. DAE4-654_Apr10)	Apr-11
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 16, 2011

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z}** = NORM_{x,y,z} * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}** are numerical linearization parameters in dB assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media.
- VR**: VR is the validity range of the calibration related to the average diode voltage or DAE voltage in mV.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV3

SN:3184

Manufactured: August 19, 2008
Calibrated: March 11, 2011

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3184

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	1.27	1.40	1.27	$\pm 10.1 \%$
DCP (mV) ^B	96.8	98.9	99.5	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc ^E (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	110.8	$\pm 3.0 \%$
			Y	0.00	0.00	1.00	117.2	
			Z	0.00	0.00	1.00	107.9	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^A The uncertainties of NormX,Y,Z do not affect the E^2 -field uncertainty inside TSL (see Pages 5 and 6).

^B Numerical linearization parameter: uncertainty not required.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3184

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^c	Relative Permittivity ^f	Conductivity (S/m) ^f	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
835	41.5	0.90	6.11	6.11	6.11	1.00	1.04	± 12.0 %
1810	40.0	1.40	5.11	5.11	5.11	0.93	1.08	± 12.0 %
1950	40.0	1.40	4.93	4.93	4.93	0.96	1.07	± 12.0 %
2450	39.2	1.80	4.48	4.48	4.48	0.73	1.28	± 12.0 %

^c Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^f At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

DASY/EASY - Parameters of Probe: ES3DV3- SN:3184

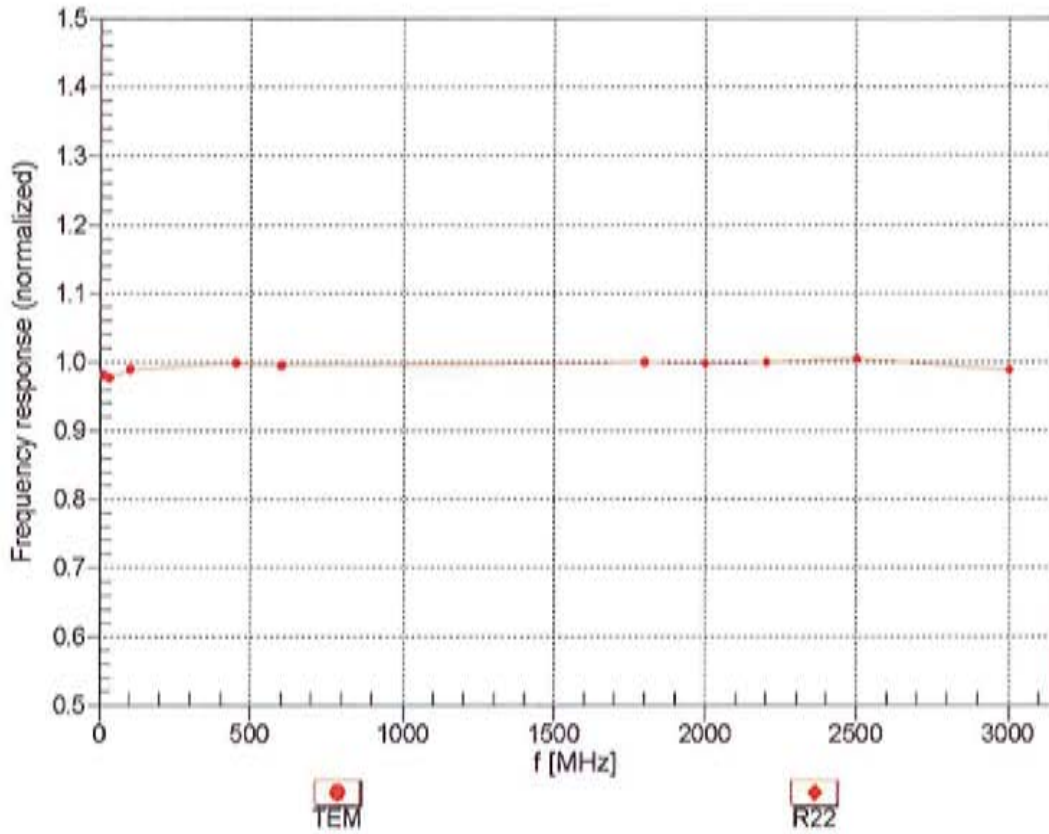
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) ^G	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
835	55.2	0.97	6.10	6.10	6.10	1.00	1.00	± 12.0 %
1810	53.3	1.52	4.90	4.90	4.90	0.87	1.26	± 12.0 %
1950	53.3	1.52	4.86	4.86	4.86	0.73	1.38	± 12.0 %
2450	52.7	1.95	4.33	4.33	4.33	1.00	1.03	± 12.0 %

^G Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

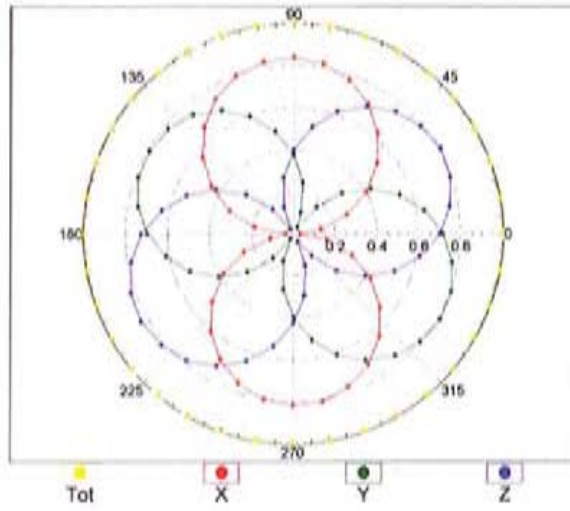
Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)



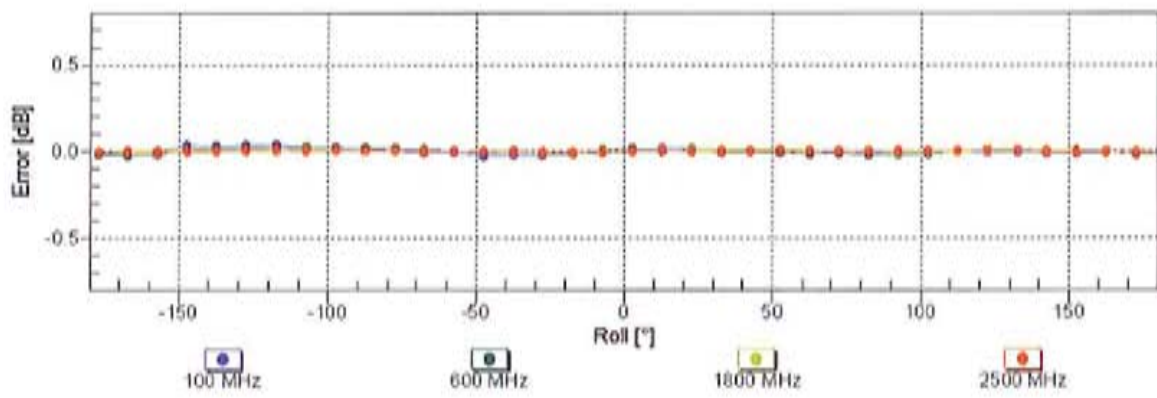
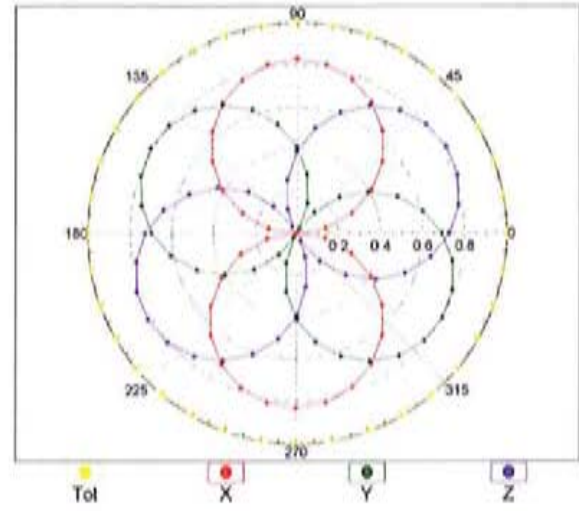
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

Receiving Pattern (ϕ), $\theta = 0^\circ$

f=600 MHz,TEM

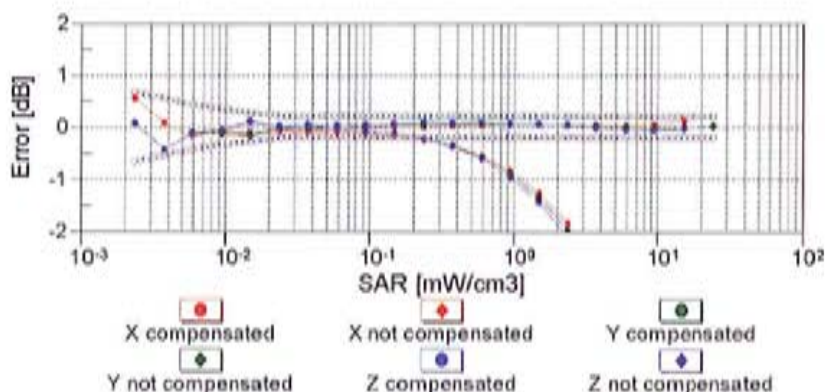
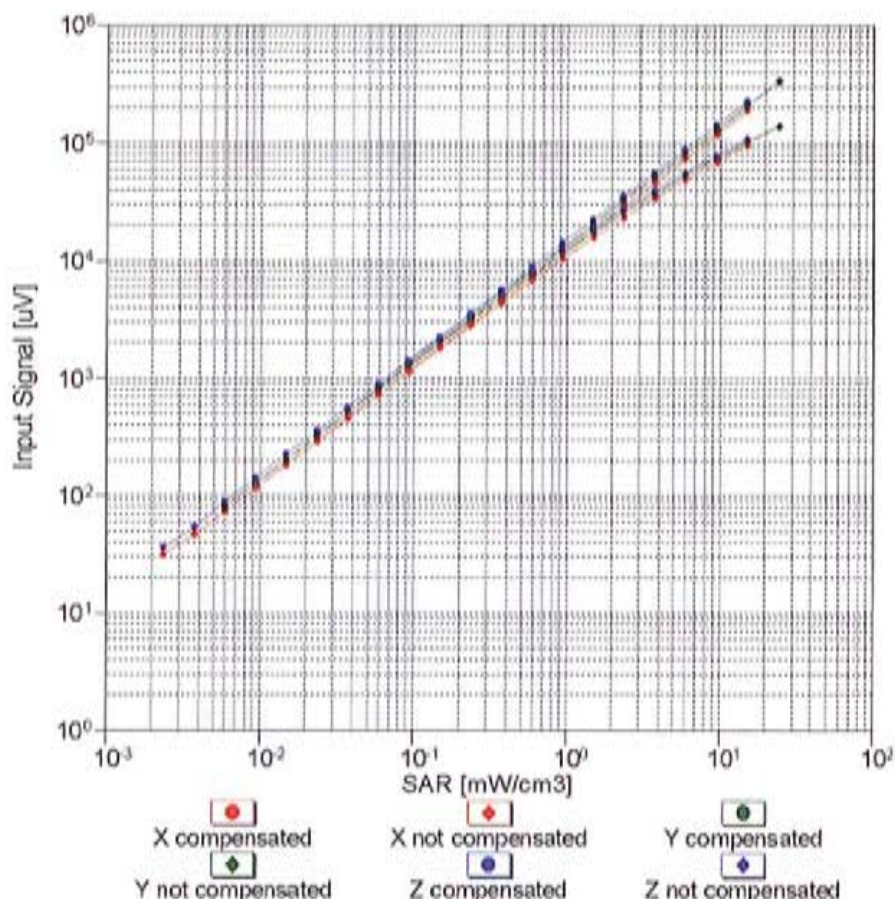


f=1800 MHz,R22



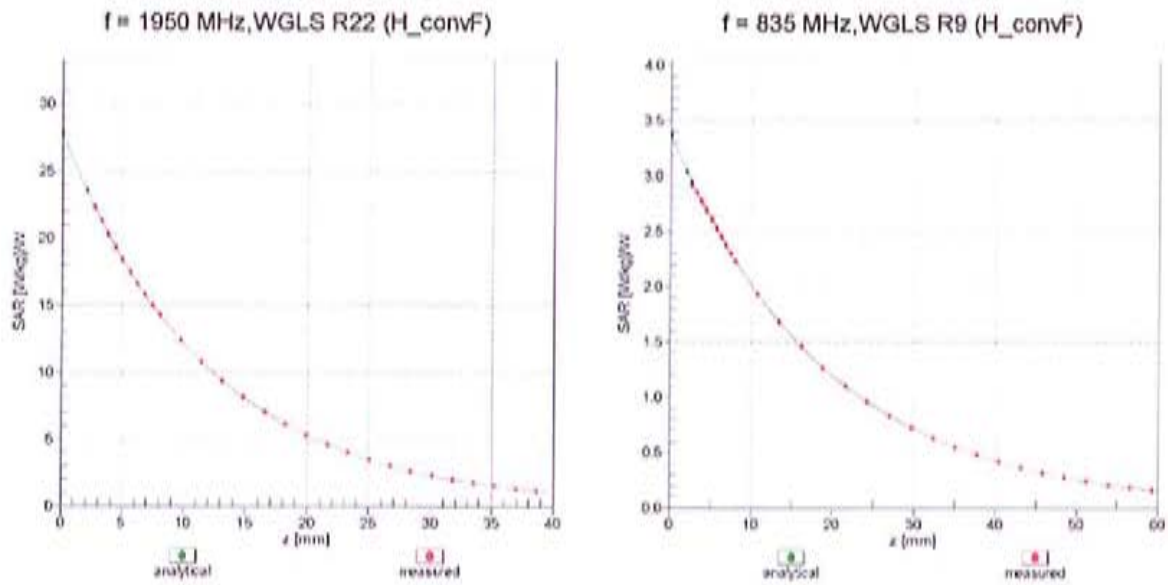
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range f(SAR_{head}) (TEM cell , f = 900 MHz)

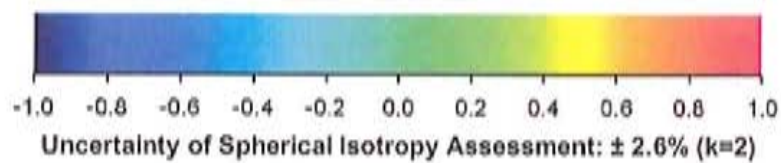
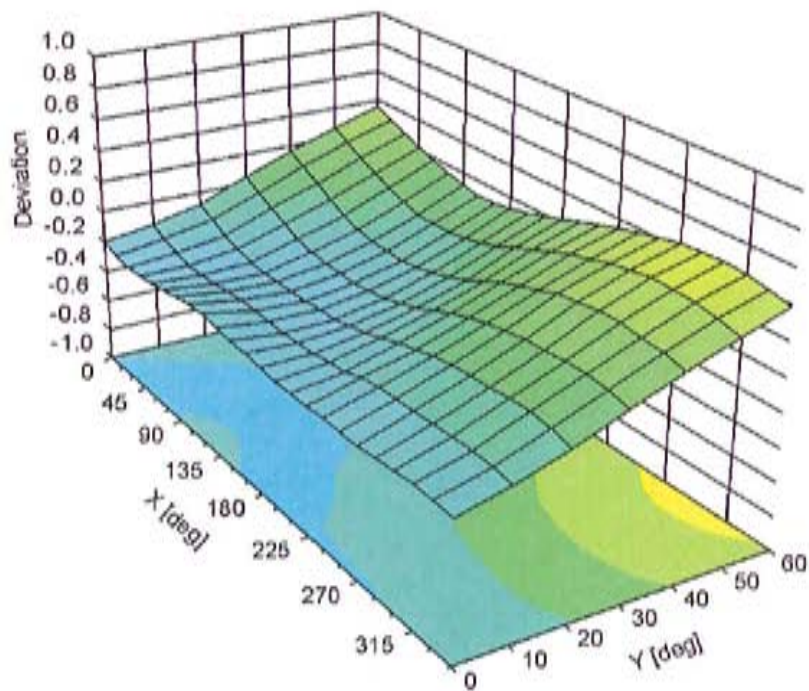


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



Deviation from Isotropy in Liquid Error (ϕ, θ), f = 900 MHz



DASY/EASY - Parameters of Probe: ES3DV3 - SN:3184**Other Probe Parameters**

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

Appendix 7

Dipole Characterization Certificate



Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Motorola MDb**

Certificate No: **D2450V2-740_Mar11**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 740**

Calibration procedure(s) **QA CAL-05.v8
Calibration procedure for dipole validation kits**

Calibration date: **March 17, 2011**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 08327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

Calibrated by: **Claudio Leubler** Name: Claudio Leubler Function: Laboratory Technician

Signature

Approved by: **Katja Pokovic** Name: Katja Pokovic Function: Technical Manager

Issued: March 21, 2011

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



Accredited by the Swiss Accreditation Service (SAS)
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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz \pm 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	38.7 \pm 6 %	1.72 mho/m \pm 6 %
Head TSL temperature during test	(22.0 \pm 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.2 mW / g
SAR normalized	normalized to 1W	52.8 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	53.8 mW /g \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.16 mW / g
SAR normalized	normalized to 1W	24.6 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	24.8 mW /g \pm 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.5 ± 6 %	1.92 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.8 mW / g
SAR normalized	normalized to 1W	51.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	51.3 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.88 mW / g
SAR normalized	normalized to 1W	23.5 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	23.5 mW / g ± 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.3 Ω + 2.6 j Ω
Return Loss	- 27.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.9 Ω + 5.3 j Ω
Return Loss	- 25.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.164 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 18, 2003

DASY5 Validation Report for Head TSL

Date/Time: 17.03.2011 12:12:34

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:740

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: HSL U12 BB

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.72$ mho/m; $\epsilon_r = 38.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

Head/d=10mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 100.2 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 26.990 W/kg

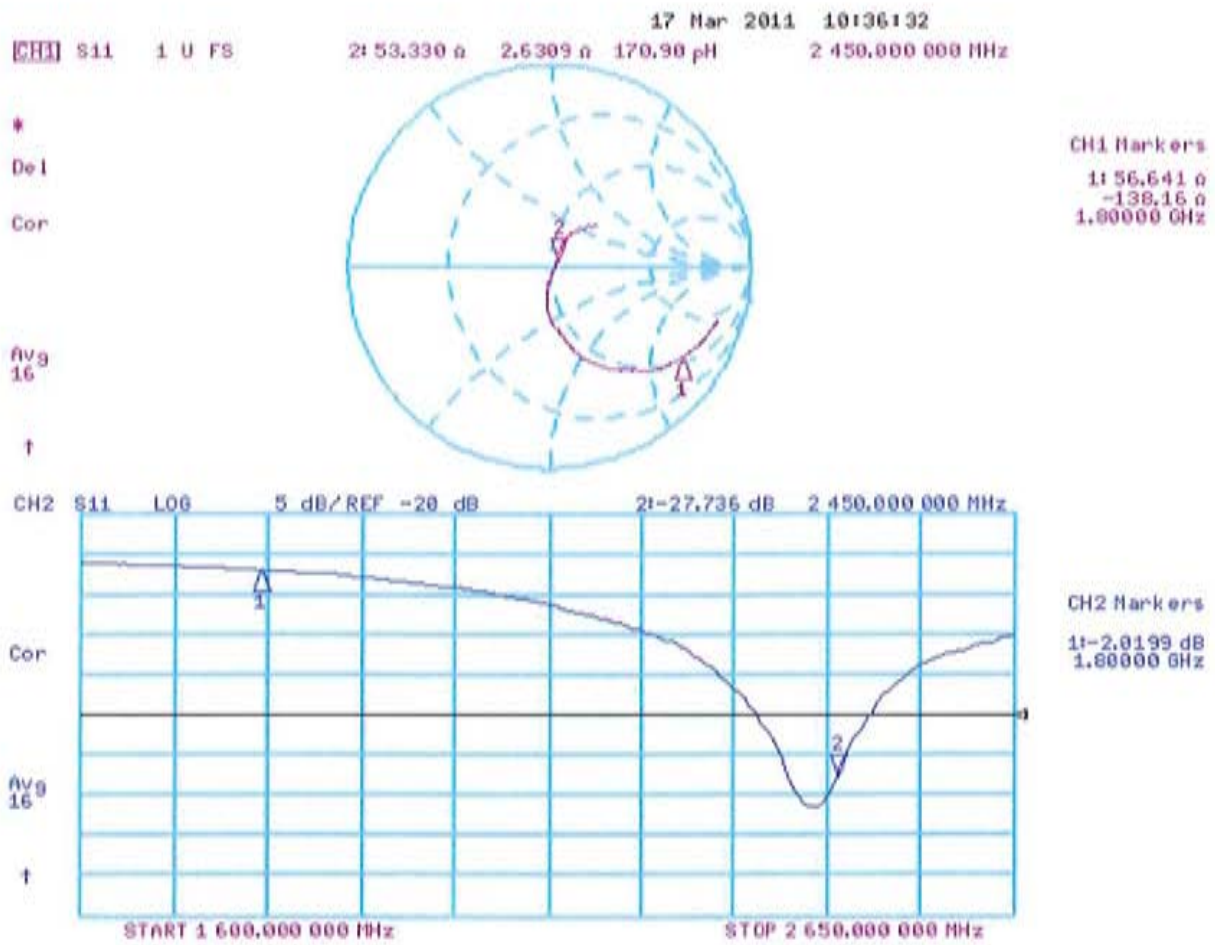
SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.16 mW/g

Maximum value of SAR (measured) = 17.012 mW/g



0 dB = 17.010mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date/Time: 17.03.2011 14:38:41

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:740

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: MSL U12 BB

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.92$ mho/m; $\epsilon_r = 51.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.31, 4.31, 4.31); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

Body/d=10mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.402 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 27.038 W/kg

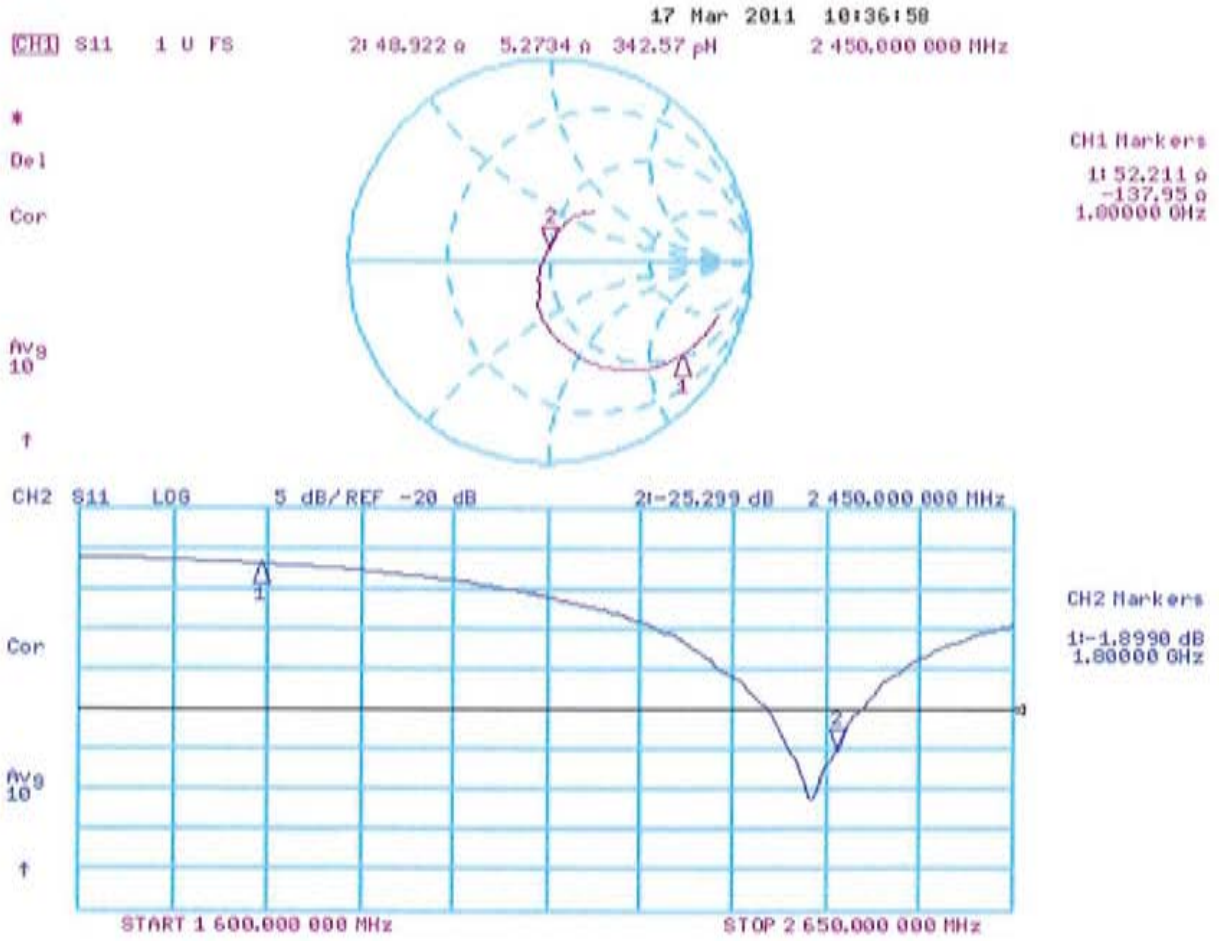
SAR(1 g) = 12.8 mW/g; SAR(10 g) = 5.88 mW/g

Maximum value of SAR (measured) = 16.855 mW/g



0 dB = 16.850mW/g

Impedance Measurement Plot for Body TSL





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Accreditation No.: **SCS 108**

Client **Motorola MDB**

Certificate No: **D1800V2-271_Mar11**

CALIBRATION CERTIFICATE

Object **D1800V2 - SN: 271**

Calibration procedure(s) **QA CAL-05.v8
Calibration procedure for dipole validation kits**

Calibration date: **March 08, 2011**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 9, 2011

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Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 MHz \pm 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	39.4 \pm 6 %	1.35 mho/m \pm 6 %
Head TSL temperature during test	(21.0 \pm 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.41 mW / g
SAR normalized	normalized to 1W	37.6 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	38.5 mW / g \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.96 mW / g
SAR normalized	normalized to 1W	19.8 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	20.0 mW / g \pm 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.2 ± 6 %	1.45 mho/m ± 6 %
Body TSL temperature during test	(21.0 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.25 mW / g
SAR normalized	normalized to 1W	37.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	37.9 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.94 mW / g
SAR normalized	normalized to 1W	19.8 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	20.0 mW / g ± 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.7 Ω + 4.2 j Ω
Return Loss	- 27.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.2 Ω + 3.9 j Ω
Return Loss	- 26.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.198 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Design Modification by End User

The dipole has been modified with Teflon Rings (TR) placed within identified markings close to the end of each dipole arm. Calibration has been performed with TR attached to the dipole.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 21, 2000

DASY5 Validation Report for Head TSL

Date/Time: 07.03.2011 12:42:07

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:271

Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: HSL U12 BB

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.34$ mho/m; $\epsilon_r = 39.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.05, 5.05, 5.05); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

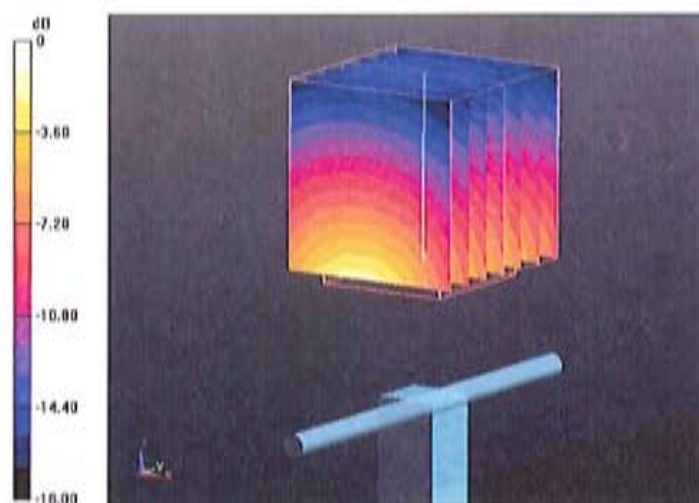
Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.375 V/m; Power Drift = 0.03 dB

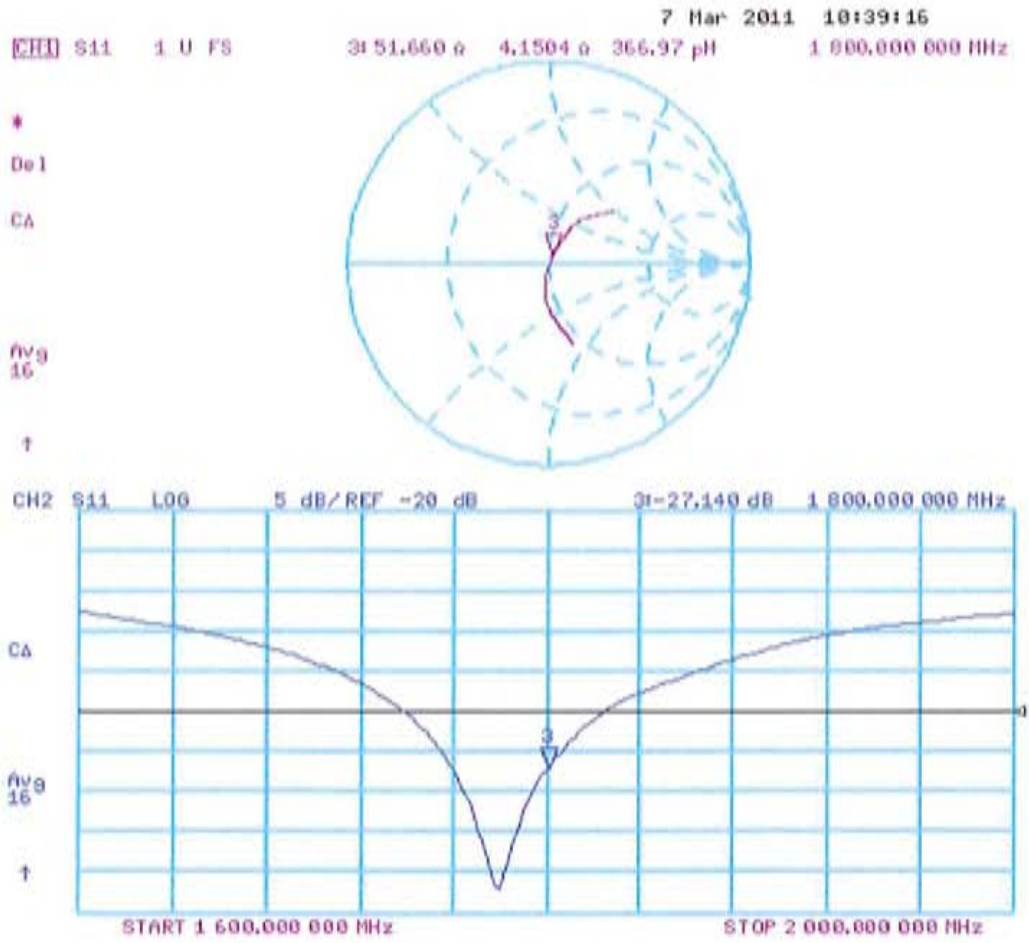
Peak SAR (extrapolated) = 17.081 W/kg

SAR(1 g) = 9.41 mW/g; SAR(10 g) = 4.96 mW/g

Maximum value of SAR (measured) = 11.630 mW/g



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date/Time: 08.03.2011 12:23:29

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:271

Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: MSL U12 BB

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.74, 4.74, 4.74); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

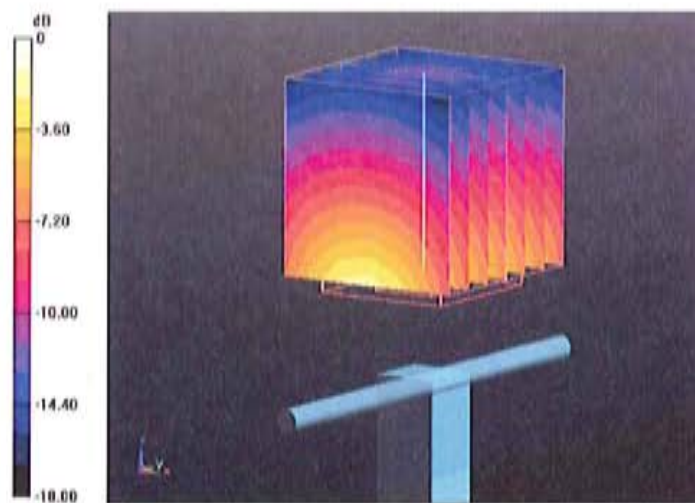
Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.157 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 15.852 W/kg

SAR(1 g) = 9.25 mW/g; SAR(10 g) = 4.94 mW/g

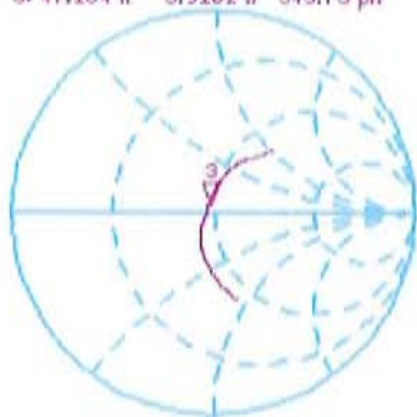
Maximum value of SAR (measured) = 11.632 mW/g



Impedance Measurement Plot for Body TSL

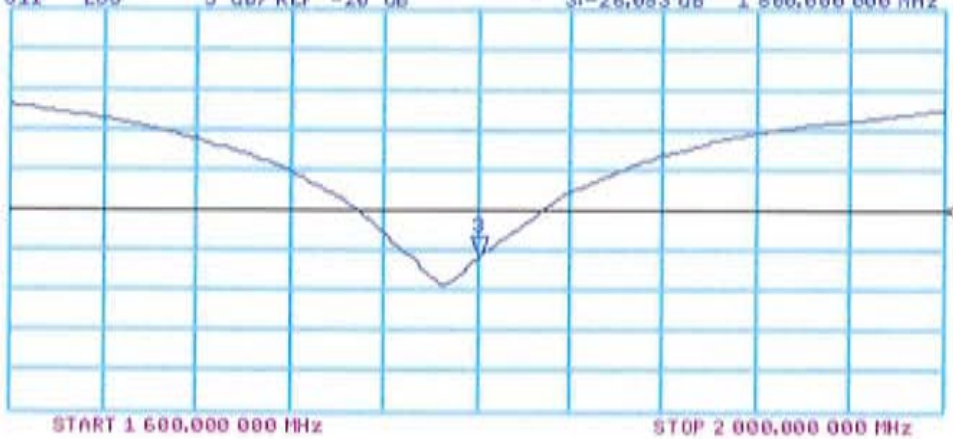
0 Mar 2011 10:11:03
 [CH1] S11 1 U FS 3f 47.164 3.9102 345.73 pH 1 800,000 000 MHz

 De1
 CA
 Avg
 16
 †



CH2 S11 LOG 5 dB/REF -20 dB 3f -26.033 dB 1 800,000 000 MHz

CA
 Avg
 16
 †





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Accreditation No.: **SCS 108**

Client **Motorola MDB**

Certificate No: **D835V2-436_Mar11**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 436**

Calibration procedure(s) **QA CAL-05.v8
Calibration procedure for dipole validation kits**

Calibration date: **March 18, 2011**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

Calibrated by: **Dimce Iliev** Name: **Dimce Iliev** Function: **Laboratory Technician** Signature: *D. Iliev*

Approved by: **Katja Pokovic** Name: **Katja Pokovic** Function: **Technical Manager** Signature: *K. Pokovic*

Issued: March 18, 2011

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Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:* SAR measured at the stated antenna input power.
- SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz \pm 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	41.0 \pm 6 %	0.89 mho/m \pm 6 %
Head TSL temperature during test	(22.0 \pm 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.42 mW / g
SAR normalized	normalized to 1W	9.68 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	9.73 mW / g \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.58 mW / g
SAR normalized	normalized to 1W	6.32 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	6.35 mW / g \pm 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.3 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature during test	(22.2 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.56 mW / g
SAR normalized	normalized to 1W	10.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	10.1 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.68 mW / g
SAR normalized	normalized to 1W	6.72 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	6.63 mW / g ± 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.4 Ω - 2.5 j Ω
Return Loss	- 31.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.5 Ω - 4.0 j Ω
Return Loss	- 26.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.379 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Design Modification by End User

The dipole has been modified with Teflon Rings (TR) placed within identified markings close to the end of each dipole arm. Calibration has been performed with TR attached to the dipole.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 15, 2000

DASY5 Validation Report for Head TSL

Date/Time: 18.03.2011 10:48:36

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:436

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL900

Medium parameters used: $f = 835$ MHz; $\sigma = 0.89$ mho/m; $\epsilon_r = 41$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

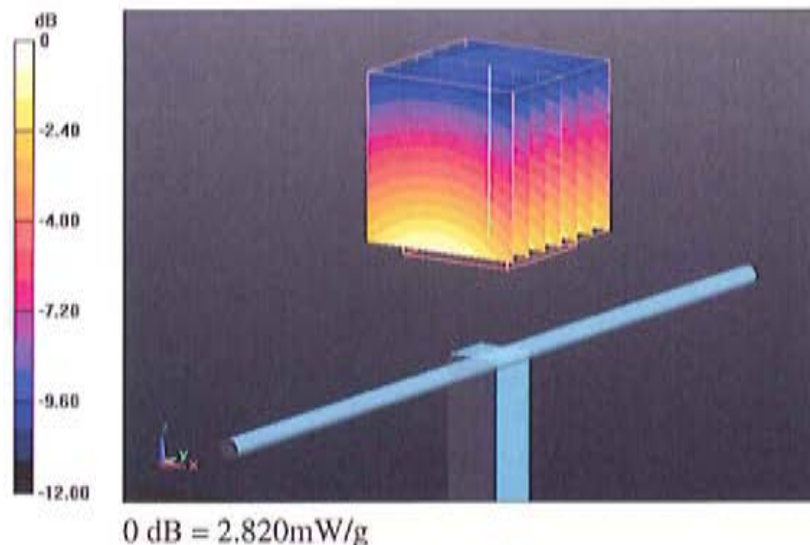
Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.928 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.620 W/kg

SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.58 mW/g

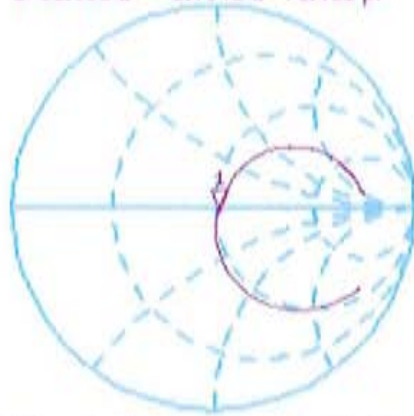
Maximum value of SAR (measured) = 2.816 mW/g



Impedance Measurement Plot for Head TSL

18 Mar 2011 10:25:19
[CH1] S11 1 U FS 1: 51.352 Ω -2.4941 Ω 76.421 pF 835.000 000 MHz

*
Del
Cor



avg
16

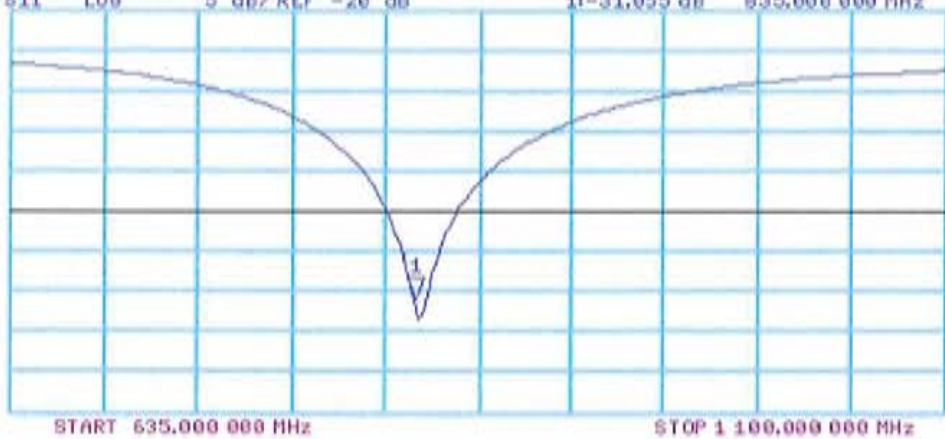
↑

CH2 S11 LOG 5 dB/REF -20 dB 1: -31.055 dB 835.000 000 MHz

Cor

avg
16

↑



DASY5 Validation Report for Body TSL

Date/Time: 16.03.2011 16:11:52

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:436

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: MSL900

Medium parameters used: $f = 835$ MHz; $\sigma = 0.99$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.86, 5.86, 5.86); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

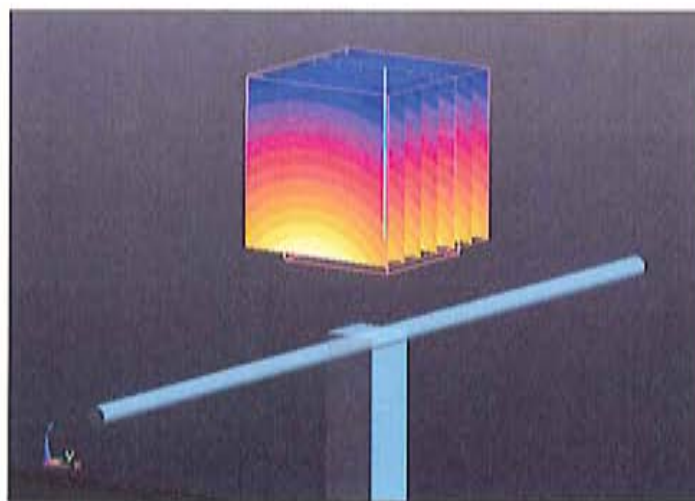
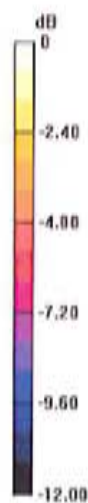
Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.649 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.789 W/kg

SAR(1 g) = 2.56 mW/g; SAR(10 g) = 1.68 mW/g

Maximum value of SAR (measured) = 2.988 mW/g

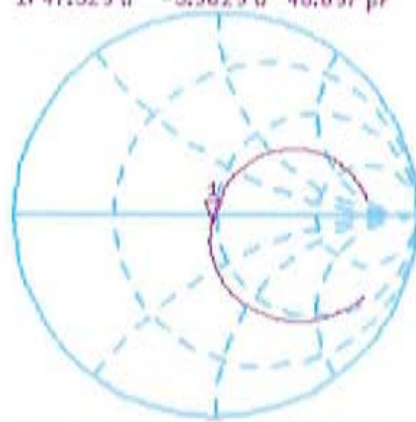


0 dB = 2.990mW/g

Impedance Measurement Plot for Body TSL

16 Mar 2011 16:17:09
 [CH1] S11 1 U FS 1: 47.529 Ω -3.9629 Ω 48.097 μF 835.000 000 MHz

*
 De1
 Cor



avg
 16

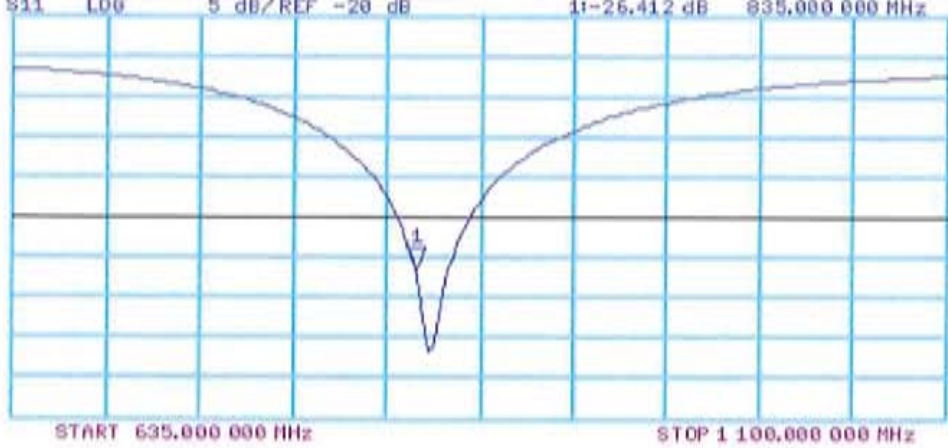
↑

CH2 S11 L06 5 dB/REF -20 dB 1: -26.412 dB 835.000 000 MHz

Cor

avg
 16

↑



END OF REPORT